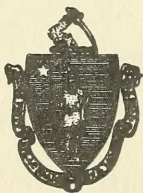


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THE UNIVERSITY OF MASSACHUSETTS

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Bulletin

GRADUATE SCHOOL

1953-1955



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THE UNIVERSITY
OF MASSACHUSETTS

Graduate School Number

1953 - 1954

1954 - 1955

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The Graduate School Catalogue for the sessions of 1953-1954, 1954-1955 is part of the Eighty-Ninth Annual Report of the University of Massachusetts and in conjunction with the general catalogue of The University it constitutes Part II of Public Document 31 (Sec. 8, Chapter 75, of the General Laws of Massachusetts).

AMHERST, MASSACHUSETTS

Volume XLV	January, 1953	Number 1
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PUBLICATION OF THIS DOCUMENT APPROVED BY GEORGE J. CRONIN, STATE PURCHASING AGENT
4m-8-52-907760

AUG 8 1956

ACADEMIC CALENDAR

1952-53

September 22, Monday	Registration of graduate students.
September 24, Wednesday, 8:00 A.M.	Classes begin.
September 25, Thursday, 10:45 A.M.	University Convocation.
September 29, Monday	Last day on which registration cards may be handed in.
October 1, Wednesday	Last day on which thesis outlines may be handed in by Ph. D. candidates who plan to finish their work by the June, 1953 Commencement.
October 7, Tuesday	Last day on which Ph. D. candidates who plan to complete their work by the June, 1953 Commencement may take the preliminary comprehensive examination.
November 3, Monday	Last day on which graduate students may drop courses without failure.
November 11, Tuesday	Armistice Day: a holiday.
November 26, Wednesday, 12:00 M. to December 1, Monday, 8:00 A.M.	Thanksgiving Recess.
December 20, Saturday, 12:00 M. to January 5, Monday, 8:00 A.M.	Christmas Recess.
January 1, Thursday	Last day on which thesis outlines may be handed in by Master's degree candidates who plan to finish their work by the 1953 Commencement.
January 5, Monday 8:00 A.M.	Classes resume.
January 22, Thursday, 5:00 P.M.	Classes stop.
January 23, Friday	Registration of graduate students for second semester.
January 26, Monday, to February 4, Wednesday	Final Examinations.
February 9, Monday, 8:00 A.M.	Second semester begins.
February 23, Monday	Washington's Birthday: a holiday.
March 20, Friday	Last day on which graduate students may drop courses without failure.
March 28, Saturday 12:00 M. to April 6, Monday	Spring Recess.
April 20, Monday	Patriot's Day: a holiday.
May 23, Saturday, 12:00 M.	Classes Stop.
May 25, Monday, to June 4, Thursday, 5:00 P.M.	Final Examinations.
May 30, Saturday	Memorial Day: a holiday.
June 1, Monday	Last day for bound theses to be handed in.
June 5, Friday, to June 7, Sunday	Commencement.

ACADEMIC CALENDAR

1953-1954

September 21, Monday	Registration of graduate students.
September 23, Wednesday	Classes begin.
September 28, Monday	Last day on which registration cards may be handed in.
October 1, Thursday	Last day on which thesis outlines may be handed in by Ph. D. candidates who plan to finish their work by the June, 1954 Commencement.
October 7, Wednesday	Last day on which Ph. D. candidates who plan to complete their work by the June, 1954 Commencement may take the preliminary comprehensive examination.
October 12, Monday	Columbus Day: a holiday.
November 2, Monday	Last day on which graduate students may drop courses without failure.
November 11, Wednesday	Armistice Day: a holiday.
November 25, Wednesday, 12:00 M. to November 30, Monday 8:00 A.M.	Thanksgiving recess.
December 19, Saturday 12:00 M. to January 4, Monday, 8:00 A.M.	Christmas recess.
January 1, Friday	Last day on which thesis outlines may be handed in by Master's degree candidates who plan to finish their work by the 1954 Commencement.
January 21, Thursday 5:00 P.M.	Classes stop.
January 22, Friday	Registration of graduate students.
January 25, Monday, to February 3, Wednesday	Final examinations.
February 8, Monday, 8:00 A.M.	Second semester begins.
February 22, Monday	Washington's Birthday: a holiday.
March 20, Saturday 12:00 M to March 29, Monday, 8:00 A.M.	Spring recess.
March 22, Monday	Last day on which graduate students may drop courses without failure.
April 15, 5:00 P.M. to April 20, Tuesday	Holiday recess.
May 22, Saturday, 12:00 M.	Classes stop.
May 24, Monday to June 3, Thursday	Final examinations.
May 31, Monday	Memorial Day: a holiday.
June 1, Tuesday	Last day for bound theses to be handed in.
June 4, Friday to June 6, Sunday	Commencement.

ACADEMIC CALENDAR

1954-1955

September 20, Monday	Registration of graduate students.
September 22, Wednesday	Classes begin.
September 28, Tuesday	Last day on which registration cards may be handed in.
October 1, Friday	Last day on which thesis outlines may be handed in by Ph. D. candidates who plan to finish their work by the June, 1955 Commencement.
October 7, Thursday	Last day on which Ph. D. candidates who plan to complete their work by the June, 1955 Commencement may take the preliminary comprehensive examination.
October 12, Tuesday	Columbus Day: a holiday.
November 1, Friday	Last day on which graduate students may drop courses without failure.
November 11, Thursday	Armistice Day: a holiday.
November 24, Wednesday, 12:00 M. to November 29, Monday 8:00 A.M.	Thanksgiving recess.
December 18, Saturday 12:00 M. to January 3, Monday, 8:00 A.M.	Christmas recess.
January 3, Monday	Last day on which thesis outlines may be handed in by Master's degree candidates who plan to finish their work by the 1955 Commencement.
January 20, Thursday, 5:00 P.M.	Classes stop.
January 21, Friday	Registration of graduate students.
January 24, Monday, to February 2, Wednesday	Final Examinations.
February 7, Monday 8:00 A.M.	Classes resume.
February 22, Tuesday	Washington's Birthday: a holiday.
March 21, Monday	Last day on which graduate students may drop courses without failure.
April 2, Saturday 12:00 to April 11, Monday, 8:00 A.M.	Spring recess.
April 19, Tuesday	Patriot's Day: a holiday.
May 21, Saturday 12:00 M.	Classes stop.
May 23, Monday, to June 2, Thursday, 5:00 P.M.	Final Examinations.
May 30, Monday	Memorial Day: a holiday.
June 1, Wednesday	Last day for bound theses to be handed in.
June 3, Friday, to June 5, Sunday	Commencement.

THE TRUSTEES OF THE UNIVERSITY

Organization of 1952

MEMBERS OF THE BOARD

TERM EXPIRES

CLIFFORD C. HUBBARD of Mansfield	1953
JOHN M. DEELY of Lee	1953
HARRY D. BROWN of Billerica	1954
JOHN W. HAIGIS of Greenfield	1954
JOSEPH W. BARTLETT of Boston	1955
PHILIP W. WHITMORE of Sunderland	1955
WILLIAM A. ORTON of Northampton	1956
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LEONARD CARMICHAEL of Medford	1958
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MEMBERS EX OFFICIO

His Excellency PAUL A. DEVER, *Governor of the Commonwealth.*
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OFFICERS OF THE TRUSTEES

His Excellency PAUL A. DEVER, *Governor of the Commonwealth, President.*
 JOSEPH W. BARTLETT of Boston, *Chairman.*
 JAMES W. BURKE of Amherst, *Secretary.*
 KENNETH W. JOHNSON of Amherst, *Treasurer.*

The Graduate School Staff

RALPH A. VAN METER, *President of the University.*
 GILBERT L. WOODSIDE, *Dean of the Graduate School.*
 Deans of the Schools.
 Heads of Divisions.
 Heads of Departments in which Graduate Courses are offered.
 Professors, Associate Professors, Assistant Professors and Instructors in charge of courses offered for graduate credit. The entire staff is listed in the General Catalogue of the University.

The Graduate School Council

GILBERT L. WOODSIDE, *Dean of the Graduate School, Chairman.*
 EMMETT BENNETT, *Assistant Professor of Chemistry, Secretary.*
 WILLIAM B. ESSELEN, JR., *Professor of Food Technology.*
 CHARLES F. FRAKER, *Head of the Department of Romance Languages.*
 JOHN HANSON, *Assistant Professor of Insect Morphology.*
 FRED P. JEFFREY, *Head of the Department of Poultry Husbandry.*
 GEORGE A. MARSTON, *Dean of the School of Engineering.*
 WARREN P. MCGUIRK, *Head of the Division of Physical Education.*
 BRUCE MORRIS, *Professor of Economics.*
 ALBERT W. PURVIS, *Head of the Department of Education.*
 FRANK P. RAND, *Dean of the School of Liberal Arts.*
 CARL S. ROYS, *Professor of Electrical Engineering.*
 DALE H. SIELING, *Dean of the School of Agriculture and Horticulture.*
 ANNE W. WERTZ, *Professor of Home Economics.*
 LEONARD R. WILSON, *Head of the Department of Geology and Mineralogy.*

GENERAL INFORMATION

HISTORY

Graduate courses leading to the degree of doctor of science were offered in botany under President Clark and in chemistry under Professor Goessmann as early as 1876. No candidate, however, completed the requirements for that degree. It was not until 1892, under President Henry H. Goodell, that courses leading to the degree of master of science were offered. This degree was first conferred in June, 1896, on two candidates. Graduate courses leading to the degree of doctor of philosophy were first offered in 1897, with chemistry, botany and entomology as major and minor subjects. The first degree was conferred on one candidate in June, 1902.

In the early years the graduate work was conducted under the direct administration of the President in conjunction with the undergraduate program. The demand for advanced work increased, however, and in June, 1908, the trustees made the Graduate School a separate unit in the College.

LOCATION AND LANDS

The University of Massachusetts is located in Amherst, a town of about eight thousand people, overlooking one of the most picturesque sections of the Connecticut Valley. Amherst is eighty-eight miles from Boston, fifty miles from Worcester, twenty-five miles from Springfield, eighteen miles from Greenfield, and eight miles from Northampton. The campus consists of a tract of approximately seven hundred acres, lying about a mile north of the village center. The University is well provided with modern buildings and equipment, description of which may be found in the general catalogue.

PURPOSE AND SCOPE OF THE GRADUATE SCHOOL

The purpose of the Graduate School is to provide qualified students with proper guidance in the methods of advanced study and research. Courses are available leading to the degree of doctor of philosophy, master of science, master of arts, master of landscape architecture, master of science in civil engineering, master of science in electrical engineering and master of science in mechanical engineering.

DOCTOR OF PHILOSOPHY

The degree is conferred upon graduate students who have met the following requirements:—

1. The preparation of a dissertation satisfactory to the thesis committee and the major department.
2. The earning of at least ninety credits, at least sixty of which must be in the major field, at least fifteen in another field or fields related to, but not part of, the major field and not more than thirty in recognition of the dissertation.
3. The passing of a preliminary written comprehensive examination in the major and minor fields supplemented by an oral examination at the option of the major department, both examinations to be conducted by the department concerned, to be passed not later than eight months before the completion of the candidate's work. In case of failure a candidate may be permitted a second and final opportunity, but not within twelve months.
4. Satisfying the following language requirement:—two languages, foreign to the candidate and not in the same linguistic group, as recommended by the major department. Proficiency tests should be passed as early as possible and must be passed prior to the preliminary examination.
5. The passing of a final examination, at least partly oral, conducted by the Thesis Committee primarily upon, but not limited to, the contents of the candidate's dissertation.

6. Satisfying the residence requirement. At least 30 course credits must have been earned at this University. No credit is valid after 9 years.

7. The payment of all fees and expenses.

MASTER OF SCIENCE, MASTER OF ARTS, MASTER OF SCIENCE IN CIVIL ENGINEERING, MASTER OF SCIENCE IN ELECTRICAL ENGINEERING, MASTER OF SCIENCE IN MECHANICAL ENGINEERING.

The basic requirements for the above degrees are:—

1. Thirty credits, of which not more than six may be transferred from other institutions. Twenty-one of the thirty credits must be in the major field. If a thesis is offered, six credits must be earned in courses open to graduate students only; if a thesis is not offered, twelve credits must be earned in courses open to graduate students only. Not more than ten credits may be earned by means of a thesis. No credit is valid after 6 years.

2. The thesis is optional with the school or department, but if there is one it shall be under the supervision of a committee appointed by the Scholarship Committee of the Graduate School Council. The thesis must be approved by this committee and by the major department. The candidate must pass an oral examination to be conducted by the thesis committee. If there is no thesis, the candidate shall take a general examination, written or oral, or both under the supervision of the head of his major department. If a student offers a thesis, problem courses shall be limited to three credits; if a thesis is not offered, the limit shall be six credits.

3. All foreign language requirements are optional with the school or departments.

4. All fees and expenses must be paid before the degree will be conferred.

MASTER OF LANDSCAPE ARCHITECTURE

The degree is conferred upon graduate students who have met the following requirements:—

1. Work covering at least two years, of which a minimum of one and one-half years must be devoted to study in residence, and a minimum of one-half year spent in practice, specific requirements concerning the nature of such practice to be laid down by the department.

2. Submission of a written report on the work done in practice, or on oral examination conducted by the department staff.

3. The earning of not less than forty-five credits of which thirty shall conform essentially to the "fifth year program" (see page 65) the remainder to be selected from the "200 series" on page 63, with minor deviations at the discretion of the department.

4. Preparation of a satisfactory thesis.

5. The passing of final examinations, written and oral.

6. Payment of all fees and expenses.

ADMISSION

Students may be admitted to the Graduate School either on limited status or on full status.

A. Requirements for admission on limited status:—

1. A Bachelor's Degree or its equivalent from any college or university of recognized standing.

2. An official transcript of all previous college work.

3. A letter of recommendation from the head of the department of the applicant's undergraduate major or a letter from his present employer. Under certain circumstances a student may enroll tentatively in courses in the University without having fulfilled requirements 2. (official transcript) and 3. (a letter from the head of the department of the applicant's undergraduate major or a letter from his present employer) but no credit will be given until the requirements are fulfilled.

4. Acceptance by the department and by the Admissions Committee of the Graduate School Council.

Graduate students on limited status will be held to the same standard of performance as Graduate Students on full status. If they wish to become Graduate Students on full status they may petition the Admissions Committee of the Graduate School Council.

They may attain full status on the completion of a satisfactory record at this University, the recommendation of the department concerned, and the approval of the Committee on Admissions.

B. Requirements for admission on full status:—

1. A Bachelor's Degree or the equivalent from any college or university of recognized standing.

2. An official transcript of all previous college work.

3. A letter of recommendation from the head of the department of the applicant's undergraduate major.

4. A letter of recommendation from someone (not connected with the applicant's undergraduate major) who is qualified to judge the student's ability in academic work.

5. The applicant must have been in the upper half of his graduating class. (Those who do not meet this requirement may apply for admission on limited status.) If the transcript does not indicate the rank of the applicant, it is the duty of the Committee on Admissions to evaluate the transcript.

6. Acceptance by the department and by the Admissions Committee of the Graduate School Council.

Admission to the Graduate School on either limited or full status does not imply admission to candidacy for an advanced degree. Such candidacy is subject to specific requirements as laid down by the several departments, and the student must secure the approval of the head of the department in which he desires to major before he can become a candidate for a degree in that subject.

GENERAL STATEMENT

A grade of 80 or above is required of each graduate student in not less than 80 per cent of all the major and minor credits which the student offers to fulfill requirements for an advanced degree. Seventy-five is the minimum passing grade in any graduate course.

After registration is completed, courses may be added or dropped or changed from credit to audit only upon the approval of the student's adviser and the Dean of the Graduate School. The consent of the instructor also is necessary for the addition of courses. If the student is not passing a course at the time it is dropped, a failure will be recorded. No student, under any conditions, may drop a course after these dates: First semester, November 1; second semester, March 20; Summer School, two weeks from the beginning of the summer session, without a failure unless granted permission by the Scholarship Committee of the Graduate School Council.

Students in the Graduate School may be dismissed for failure to abide by the rules of the University.

The University reserves the right to make changes in the requirements for degrees without notice.

COURSES OFFERED

Courses available as major subjects for the degree of doctor of philosophy:—

Agronomy	Economics
Bacteriology	Entomology
Botany	Food Sciences
Chemistry	Food Technology

Courses available as major subjects for the master's degree:—

Agricultural Economics	History
Agronomy	Home Economics
Animal Husbandry	Landscape Architecture
Bacteriology	Mathematics
Botany	Mechanical Engineering
Chemistry	Olericulture
Civil Engineering	Philosophy
Dairy Industry	Physical Education for Men
Economics	Pomology
Education	Poultry Science
Electrical Engineering	Psychology
English	Public Health
Entomology	Romance Languages
Floriculture	Wildlife Management
Food Technology	Zoology
Geology and Mineralogy	

Courses available as minor subjects:—

Agricultural Economics and Farm Management	Government
Agronomy	History
Animal Husbandry	Home Economics
Bacteriology	Landscape Architecture
Botany	Mathematics
Chemistry	Olericulture
Dairy Industry	Philosophy
Economics	Physical Education for Men
Education	Physics
Engineering	Pomology
English	Poultry Science
Entomology	Psychology
Floriculture	Public Health
Food Technology	Romance Languages
Forestry	Sociology
Geology and Mineralogy	Veterinary Science
German	Wildlife Management
	Zoology

THESES

A thesis must be on a topic in the field of the candidate's major subject, and must indicate that its writer possesses the ability and imagination necessary to do independent constructive thinking. The following rules should be adhered to in the preparation and presentation of a thesis:—

The objective of a thesis should be an attempt to make a real contribution to knowledge and practice. When completed it should be of a quality worthy of publication as a contribution from the department concerned.

The thesis, in its completed form, will be judged largely upon the ability of the author to review literature and reach definite deductions; to formulate a problem, plan a method of attack, and work out a solution; and to summarize his material and draw conclusions. Scholastic attainment in writing and presenting the results of the study will also be an important factor in the evaluation. No thesis markedly poor in its English will be accepted.

Four copies of each Master's thesis outline and six copies of each Doctor's thesis outline are to be transmitted to the Dean of the Graduate School by the head of the department in which the student is majoring. The letter of transmittal should contain the name of the professor within the department who is responsible for the direction of the student's research. This professor will be appointed the Chairman of the student's Thesis Committee. Other possible members of the Thesis Committee might be suggested in the letter of transmittal, but the Scholarship Committee of the Graduate School Council has the responsibility of assigning all faculty members to Thesis Committees.

It is the responsibility of the chairman of the Thesis Committee to arrange a conference with other members of the Thesis Committee and the student for the purpose of discussing the research problem before approving the thesis outline. This should be done as soon as possible after the appointment of the Thesis Committee.

The fourth (or sixth, if Ph.D.) copy of the student's thesis outline is then to be signed by each member of the Thesis Committee to indicate approval of the outline and to indicate the fact that a conference with the student has been held. The fourth (or sixth) copy of the thesis outline is then to be returned to the Dean of the Graduate School.

The outline for the thesis for the Master's Degree must be presented not later than January first of the year in which the student expects to get the degree, or five months before he expects to complete the work for the degree.

The outline for the thesis for the Doctor of Philosophy degree must be presented by October first, prior to the June Commencement at which the student expects to get the degree.

The Thesis Committee will have direct charge of all matters pertaining to the thesis, and it is recommended that the student use the advice available from this source in the progress of his research. The thesis must have the approval of this committee and of the major department before arrangements are made for the final examination for the degree.

Three complete, bound copies of the thesis, including drawings and any other accessories, are required by the Graduate School office in order that the files in the Graduate Dean's office, the library and the department in which the thesis was prepared may be supplied. The student is responsible for the binding of the thesis.

If the thesis is printed, whether in periodical or book form, the fact that it is a thesis submitted for an advanced degree at the University of Massachusetts shall be explicitly stated in the title itself or as a footnote on the front page.

Because of the time required to give adequate consideration to the research conducted by the student, it is highly desirable that theses be submitted to the committee, in the case of doctor's theses, not later than March 15, and in

the case of master's theses, not later than May 15 of the academic year in which the degrees are to be conferred. The theses in their final bound form shall be deposited with the Dean of the Graduate School by June 1.

If typewritten, whether designed for publication or to remain in the type-written form, the size of the sheet, the arrangement of the title page, the general structure of the thesis, the character of the paper, and the binding must conform to definite standards.

- A. *Size of sheet.* Size of sheet must measure $8\frac{1}{2} \times 11$ inches.
- B. *Form of title page.* The title page should be distributed as artistically as possible and must be arranged in this order:
 - a. Subject.
 - b. Name of author.
 - c. "Thesis submitted in partial fulfillment of the requirements for the degree of—."
 - d. "University of Massachusetts, Amherst."
 - e. Date.
- C. Following the title page, the arrangement may take such form, variable of course with the subject matter, as is illustrated below:—
 - a. An analytical outline of the thesis.
 - b. An introductory statement in which the purposes of the author are set forth.
 - c. The body of the thesis composed of literature critically reviewed and deductions made, formulation of method of attack or procedure, and results secured. (All literature reviews and any work done by others should be so separated that no question can be raised as to which portion of the thesis represents the original investigation. It should be clearly kept in mind that *compilation* is not considered original investigation.)
 - d. Summary and conclusions.
 - e. Bibliography. (This should have the approval of the chairman of the thesis committee before final arrangement.)
 - f. Acknowledgments.
 - g. Statements of approval signed by members of the thesis committee.
- D. *Paper.* See sample in the University store.
- E. *Binding.* See sample of binding in the Graduate School Office.

All theses are the property of the University.

ESTIMATE OF EXPENSES

A charge of \$50 per semester, payable in advance, which covers tuition, laboratory and student health fees, is imposed on students who are residents of Massachusetts. For residents of other states or foreign countries, this charge is \$110 per semester. In cases where students carry less than a full schedule of courses, a special tuition rate is provided. For purposes of definition, all students claiming residence in the State shall at time of admission provide the treasurer's office with an official statement from their town or city clerk as evidence.

Board should not be in excess of \$12 per week. Rooms for graduate students are not available in the dormitories, but can be rented in private homes at from \$20 to \$25 per month. The cost of books and incidentals should not exceed \$150 per year.

LOTTA CRABTREE FELLOWSHIPS

A limited number of fellowships paying \$2000 each are available to students in the broad field of agriculture. Students applying for these fellowships must be interested in earning the Doctor of Philosophy degree for the purpose of serving agricultural pursuits. Application should be made to the Dean of the Graduate School.

LOTTA CRABTREE SCHOLARSHIPS

The Lotta Crabtree Agricultural Fund provides for a limited number of scholarships as an award to worthy graduates of the University of Massachusetts interested in continuing their education in agricultural or physical and biological sciences. These scholarships pay \$500 per annum and application for consideration should be made to the Dean of the Graduate School.

TEACHING FELLOWSHIPS

The University offers a number of teaching fellowships for the purpose of assisting with the instructional program of various departments. The stipend is \$800 per year, and appointments absolve students from tuition and are especially suited to those who desire to gain teaching experience and to make themselves at least partly self-supporting while continuing their education. It should be recognized, however, that, in cases where students render this part-time service in return for the financial assistance extended, the residence time requirement for the degree in question is necessarily longer. Teaching fellows may carry up to 13 credits per semester, but the total in any one academic year may not exceed 24 credits. Application for appointment to these fellowships should be made to the Dean of the Graduate School or to the head of the department in which the candidate's major interest lies.

RESEARCH FELLOWSHIPS

A number of research fellowships are available to qualified graduate students. These are made possible because funds are provided by a). various industries, b). the Experiment Station, or c). research grants awarded to members of the Graduate School Faculty either from sources outside the University or from a fund provided by the University and administered by the Teaching Staff Research Council. Stipends vary with the type of work and the amount of time involved. Interested students should make application to the head of the department in which they plan to work.

THE CRAMPTON RESEARCH FUND

Interest from the Guy Chester Crampton Research Fund is used to help defray the costs of publication of worthy research papers completed by students or occasionally by staff members. Information concerning the fields of work for which grants may be made, and instructions for application, may be obtained from department heads, the chairman of the Crampton Fund Committee or the graduate school office.

GRADUATE COURSES DURING THE SUMMER

The University offers opportunities to pursue graduate courses during the summer in connection with the Summer School. Details regarding courses offered, facilities for study, etc., may be found in the Summer School Catalogue, a copy of which is available upon request to the Dean of the University.

DESCRIPTION OF COURSES

Agricultural Economics

ADRIAN H. LINDSEY, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. RESEARCH.—Investigations of problems in Agricultural Economics and Farm Management. Credit, 3.

Mr. LINDSEY.

202. AGRICULTURAL PRICE THEORY.—The application of economic principles and measurements to the analysis of agricultural prices. Credit, 3.

Mr. LINDSEY.

300. THESIS, Master's Degree. Credit, 4-10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

155. MARKETING.—An analysis of the problems, types of marketing agencies, principal marketing functions, marketing costs and margins, price quotations and exchange operations, governmental regulations and the consideration of improvement proposals. Credit, 3.

Mr. LINDSEY.

156. FUNDAMENTALS OF COOPERATION.—A study of the development of co-operative organizations and the economic analysis of cooperative principles and operation. Credit, 3.

Mr. LINDSEY.

157. AGRICULTURAL CREDIT AND LAND APPRAISAL.—The principles and methods of land valuation and credit extension. There is also a study of the operations of institutions granting credit to agriculture. Credit, 3.

Mr. LINDSEY.

171. AGRICULTURAL ECONOMIC THEORY.—A comparative and critical study of the significant contributions of the leading economists from Adam Smith to the present. Credit, 3.

Mr. LINDSEY.

175. FARM ORGANIZATION AND MANAGEMENT.—External and internal economic forces affecting the farm business such as selection and combination of factors of farm production, choice and combination of farm enterprises, and adjusting farm production to markets and prices. Credit, 3.

Mr. BARRETT.

176. ADVANCED FARM MANAGEMENT.—The use of farm records as a basis for planning and budgeting is emphasized. The last part of the course will be given over to the specific study of selected farms. Field trips are required at an estimated cost of not over five dollars. Credit, 2.

Mr. BARRETT.

Prerequisite, Agricultural Economics 175.

178. **PRINCIPLES OF LAND ECONOMICS.**—A study of the utilization of agricultural land and the economic problems of development, settlement, conservation and policy. Credit, 3.
Mr. LINDSEY.

179. **ELEMENTARY STATISTICS THROUGH SIMPLE CORRELATION.** Credit, 3.
Mr. RUSSELL

180. **ADVANCED STATISTICAL METHOD.**—Multiple correlation and analysis of variance. Credit, 3.
Mr. LINDSEY and Mr. RUSSELL

182. **ADVANCED FARM OPERATION.**—A study of farm operations with special emphasis on time and motion experiments. Credit, 3.
Mr. BARRETT.

189. **SEMINAR.**—Public and price policy for agriculture. Credit, 2-3.
Mr. LINDSEY.

190. **SEMINAR.**—Agricultural Institutions. Credit, 2-3.
Mr. RUSSELL

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Economics 155. **ECONOMICS OF CONSUMPTION.** Credit, 3.
Mr. HALLER.

Economics 156. **BUSINESS CYCLES.** Credit, 3.
Mr. KIMBALL.

Economics 165. **CORPORATION FINANCE.** Credit, 3.
Mr. KIMBALL.

Economics 170. **MONOPOLIES.** Credit, 3.
Mr. HALLER.

Economics 174. **ADVANCED ECONOMIC THEORY.** Credit, 3.
Mr. DYMOND.

Economics 178. **PUBLIC FINANCE.** Credit, 3.
Mr. GAMBLE.

Agricultural Engineering

COURSES FOR MINOR CREDIT ONLY

171. **FARM POWER.**—The study of internal combustion engines used in farm tractors and power units.

Two class hours; one 2-hour laboratory period. Credit, 3.
Prerequisites, C.E. 52, M.E. 65, 68. Mr. PFLUG.

173. **FARM STRUCTURES.**—A study of the strength and durability of building materials, construction systems and the mechanical principles underlying their use in farm-construction. In the drafting room studies will be made of some major farm building and complete working drawings finished in all essential details.

One class hour; three 2-hour laboratory periods. Credit, 4.
Prerequisites, C.E. 34, 51; M.E. 61. Mr. STAPLETON.

176. **AGRICULTURAL MACHINERY.**—The study of design and operational problems of agricultural field machinery.

Two class hours; one 2-hour laboratory period.

Credit, 3.

Prerequisites, C.E. 52; M.E. 68, 83.

Mr. STAPLETON.

178. **DRAINAGE, RECLAMATION AND CONSERVATION.**—The course covers the engineering phase of drainage and reclamation. The various systems are studied, complete layouts established in the field, and problems of flow and run-off given.

One class hour; two 2-hour laboratory periods.

Credit, 3.

Prerequisites, C.E. 25, 75, or 76; Agronomy 2.

Mr. PFLUG.

180. **FOOD PROCESS ENGINEERING.**—A study of food processing machinery, steam boilers, evaporators, pumps, refrigeration machinery, and heat controlling devices. The course deals with problems of heat transfer in foods and processing equipment.

Credit, 3.

Mr. TAGUE.

182. **REFRIGERATION.**—Fundamentals in planning and operating a refrigerated storage. Topics covered are size, construction, cooling load, and refrigerating machinery and accessories. Available to non-engineering majors only.

Credit, 2.

Mr. PFLUG.

183, 184. **AGRICULTURAL ENGINEERING PROBLEMS.**—This course consists of individual problems chosen by the students under guidance of the department. The work is of an advanced nature, supplementing that of the regular agricultural engineering curriculum.

Credit, 3.

THE DEPARTMENT.

185. **RURAL ELECTRIFICATION.**—A course devoted to the utilization of electricity in agriculture.

Two class hours; one 2-hour laboratory period.

Credit, 3.

Prerequisites, E.E. 61, 62.

Mr. PFLUG.

Agronomy

WILLIAM G. COLBY, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. **SPECIAL PROBLEMS.**

Credit, 3 or 6.

THE STAFF.

211. **FIELD CROP PRODUCTION.**—A survey course which includes the regional distribution, the cultural requirements, production, and the utilization of the principal field crops grown in the U. S. Given in alternate years, beginning 1953-54.

Credit, 3.

Mr. COLBY.

216. **FORAGE CROPS.**—A survey course which includes the regional distribution, the cultural requirements and the utilization of the principal forage crops grown in the U. S. Given in alternate years, beginning 1952-53.

Credit, 3.

Mr. COLBY.

226. **CROP IMPROVEMENT.**—This is a course in applied genetics involving a study of various plant breeding procedures used in the improvement of important agricultural crops.

Credit, 3.

Mr. YEGIAN.

Prerequisite, Zoology 153, Plant Breeding 152.

263. **CHEMISTRY OF THE SOIL.**—The chemistry of soil formation, soil acidity, nutrient element availability, ionic exchange and fixation, biological soils reactions, soil-plant-microorganism relationships, and of organic matter of the soil will be discussed. The laboratory work will consist of physical, analytical and biochemical investigations of soils and important soil constituents.

Credit, 5.

Mr. STECKEL.

264. **EXPERIMENTAL METHODS IN AGRONOMY.**—The purpose of this course is to set forth some of the concepts regarding the application of statistics to the analysis and interpretation of data obtained in agricultural research. Such points as choice of field, design of experiments, effect of competition, interpretation of results, and other special factors that need to be considered in well-planned experiments are discussed.

Credit, 3.

Mr. YEGIAN.

290. **SEMINAR.**

Credit, 1 each semester.

THE STAFF.

300. **THESIS, Master's degree.**

Credit, 10.

400. **THESIS, Ph. D. degree.**

Credit, 30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

151. **FIELD CROPS.**—A study of the field crops of the U. S. which will include their uses and improvement, with their soil and climatic requirements. Emphasis will be given to the best farm practices of the northeastern states as to rotation, liming, seeding methods, tillage, disease and insect control, and methods of harvesting and storage. As an individual problem, each student must make a detailed plan of crop production for the actual conditions of some New England farm.

Credit, 3.

Mr. PARSONS.

152. **SOIL UTILIZATION.**—The relationship of climate and native vegetation to the broader aspects of soil formation; man's use of land resources; soil use and abuse; soil erosion control and its significance to permanent agriculture.

Credit, 3.

Mr. EVERSON.

153. **AGROSTOLOGY.**—All factors that influence the successful growing of fine turf grasses are studied and correlated to enable the student to have a practical working knowledge of the construction and maintenance of lawns, sports, highways, airport and cemetery turf.

Credit, 3.

Mr. DICKINSON.

156. **AGROSTOLOGY.**—This course considers fine turf management as a business and profession. Emphasis is placed on diagnosis and treatment of turf failures; the selection of equipment and supplies and client approach. Field trips and practical exercises arranged.

Credit, 3.

Mr. DICKINSON.

157. **SOIL FORMATION.**—Physical, chemical, biological, climatic and geological factors involved in soil formation. The relationship of these factors to the kinds of soils formed in the United States.

Credit, 3.

Mr. EVERSON.

179. SOIL PHYSICS.—For seniors in Agronomy. The factors in soil which control tilth and energy relationships and the laws of physics which govern these factors are discussed. This includes heat, light, color, particle size and charge, water and gas movement, energy relationships and other physical factors effecting changes in the soil. The laboratory is used to familiarize the students with various methods used in measuring these important physical factors. Credit, 3.

Mr. EVERSON.

184 A. SOIL CHEMISTRY.—For plant science and soil science students. Fundamental inorganic, organic, and biochemical reactions of soils. Plant nutrition and microbiological plant interrelationships. Credit, 3.

Mr. STECKEL.

Prerequisites, Chemistry 29, Botany 168, Agronomy 157.

184 B. SOIL CHEMISTRY LABORATORY.—Primarily for seniors in Agronomy. Methods and techniques used in soil chemistry research and in plant science investigations will be studied. The student will be made familiar with methods of determining exchangeable bases, base exchange capacity, soil phosphate fractionation, and many other determinations peculiar to soil investigations. To be taken concurrently with Agronomy 184 A. Credit, 2.

Mr. STECKEL.

Prerequisites, Chemistry 29, 30, Botany 168, Agronomy 157.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Bacteriology 211. ADVANCED BACTERIOLOGY. Credit, 3.
Miss GARVEY.

Botany 202, 203. ADVANCED PLANT PHYSIOLOGY. Credit, 4 each semester.
Mr. KOZŁOWSKI.

Botany 205, 206. ADVANCED PLANT PATHOLOGY. Credit, 2-4 each semester.
Mr. BANFIELD.

Botany 159, 160. THE ANGIOSPERMS. Credit, 3-5 each semester.
Mr. TORREY

Botany 166. GENERAL MYCOLOGY. Credit, 3.
Mr. BANFIELD

Botany 167, 168. INTRODUCTORY PLANT PHYSIOLOGY. Credit, 3 each semester
Mr. KOZŁOWSKI

Botany 175. METHODS IN PLANT PATHOLOGY. Credit, 3.
Mr. BANFIELD.

Botany 181. PLANT ECOLOGY. Credit, 3.
Mr. LIVINGSTON.

Botany 182. PLANT GEOGRAPHY. Credit, 2.
Mr. HODGE.

Botany 188. PLANT CYTOGENETICS. Credit, 3.
Mr. SPENSER.

Chemistry 208. CHEMICAL SPECTROSCOPY.	Credit, 3. Mr. SMITH.
Chemistry 210. ATOMIC AND MOLECULAR THEORY.	Credit, 3. Mr. SMITH.
Chemistry 237. BIOCOLLOIDS.	Credit, 3. Mr. TURNER.
Chemistry 151, 152. ORGANIC CHEMISTRY.	Credit, 4 each semester. Mr. RITCHIE and Mr. CANNON.
Chemistry 165, 166. PHYSICAL CHEMISTRY.	Credit, 4 each semester. Mr. FESSENDEN and Mr. SMITH.
Chemistry 179. BIOCHEMISTRY.	Credit, 4. Mr. TURNER.
Civil Engineering 280. APPLIED SOIL MECHANICS.	Credit, 3. Mr. HENDRICKSON.
Geology 201. OPTICAL MINERALOGY.	Credit, 3. Mr. NELSON.
Geology 151. MINERALOGY.	Credit, 3. Mr. NELSON.
Geology 152. PETROLOGY.	Credit, 3. Mr. NELSON.
Geology 161. GEOMORPHOLOGY.	Credit, 3. Mr. WILSON.
Home Economics 203. ADVANCED NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.	Credit, 3. Miss MITCHELL.
Home Economics 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.	Credit, 3. Miss MITCHELL.
Plant Breeding 152. ADVANCED PLANT BREEDING.	Credit, 3. Mr. FRENCH.
Plant Breeding 181. PLANT CYTOLOGICAL TECHNIQUES.	Credit, 2. Mr. FRENCH.
Plant Breeding 182. SPECIAL PROBLEM IN PLANT BREEDING.	Credit, 2. Mr. FRENCH.
Poultry Science 203. ADVANCED GENETICS.	Credit, 3. Mr. HAYS.
Poultry Science 204. ADVANCED GENETICS.	Credit, 3. Mr. HAYS.

Animal Husbandry

VICTOR A. RICE, Major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

Major credit for Animal Husbandry Department students assumes prerequisites in the Animal Husbandry field as covered in undergraduate courses in this University. All hours by arrangement.

200. PROBLEMS IN LIVESTOCK PRODUCTION.—This course will deal with some specific problem in feeding, breeding, production or management as relates to the production of some specific livestock product such as milk, wool, meat and so on. Assistance will be given in outlining the problem and setting up the experimental procedure with the student responsible for collecting and analyzing the data.

Credit, 5.

THE STAFF.

205. ADVANCED ANIMAL NUTRITION.—The chemistry of feed stuffs and the chemistry and physiology of digestion, absorption and utilization of energy, proteins, minerals and vitamins in milk, meat, wool or work production. Recent and current research will be evaluated. Given in alternate years only.

Credit, 5

Mr. ARCHIBALD and Mr. ELLIOT.

Prerequisite, 151 or its equivalent.

210. ADVANCED ANIMAL BREEDING.—This course will stress selectively the physiology of reproduction, genetics, systems of breeding and selection according to the student's needs and objectives. The student will, in addition, make a thorough review and analysis of available data in the field of his choice. Not a problem course.

Credit, 5.

Prerequisites 175, 176 or equivalent.

Mr. RICE and Mr. COWAN.

220. MILK SECRETION.—The fundamentals of milk secretion including the gross and microscopic anatomy of the mammary gland. The development of the mammary gland from birth through parturition and lactation will be studied. The physiology of milk secretion will be reviewed both in relation to the endocrine glands which control it and to more practical aspects of successful dairy cattle management.

Credit, 3.

Mr. FOLEY.

230. ANIMAL HUSBANDRY RESEARCH EVALUATION.—Some specific phase or phases of research in Animal Husbandry will be selected and a running critical evaluation will be presented weekly in oral form and at semester's end in written form.

Credit, 5.

THE STAFF.

300. THESIS, Master's degree.

Credit, 5-10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(Minor credit only for Animal Husbandry Department Students.)

151. THE NUTRITION OF FARM ANIMALS.—The mechanics of digestion, absorption, metabolism, and excretion; the functions of proteins, carbohydrates, fats, vitamins, and minerals in body metabolism; the functions of those endocrine glands primarily concerned with nutrition; the nature and value of the various feed stuffs; and methods of calculating rations in order to meet the requirements of various classes of livestock.

3 class hours; one 2-hour laboratory period.

Credit, 4.

Mr. ARCHIBALD and Mr. ELLIOT.

153. **ELEMENTS OF MEAT PACKING.** For department majors only. The development of the modern packing industry, the history of meat inspection, the principles of meat preservation, the classification of cattle, calves, sheep and swine into proper market classes and grades and slaughtering and dressing operations. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars.

Credit, 3.

1 class hour; two 2-hour laboratory periods.

Mr. HALE.

154. **MEAT PROCESSING.**—For students not majoring in Animal Husbandry. The physical properties, preservation, processing and identification of meats. The laboratory periods will be devoted to slaughtering, cutting, curing, smoking and freezing of meat. One packing plant field trip will be made—approximate cost \$5.00.

Credit, 2.

Permission of instructor is required.

Mr. TIMBERLAKE.

Two 2-hour laboratory periods.

156. **BEEF AND SHEEP PRODUCTION.**—The historical and economic development, present status and probable future trends of beef and sheep production in the United States, especially in New England. Consideration will be given to types of production, systems and methods of feeding, management and marketing. In the laboratory, practice will be obtained in fitting and showing as well as certain practical techniques such as dehorning, ear-tagging, castrating, foot-trimming, shearing, etc., and treatment and prevention of external and internal parasites as well as common ailments.

2 class hours; one 2-hour laboratory period.

Credit, 3.

Mr. COWAN.

156A. **GENERAL LIVESTOCK JUDGING AND FIELD TRIPS.**—This course is given in conjunction with Animal Husbandry 156 and consists of practice in judging and selecting beef cattle, sheep, horses and swine. Throughout the spring, field trips are made to nearby livestock farms and breeding establishments.

Credit, 1.
One 4-hour laboratory period.

Mr. COWAN.

172. **MEAT JUDGING.**—The classification, grading, and judging of carcasses and cuts of beef, veal, lamb and pork.

Credit, 1.

One 4-hour laboratory period.

Mr. HALE.

Prerequisites, Animal Husbandry 151 and 153 or permission of instructor.

174. **ADVANCED MEAT STUDIES.**—For Animal Husbandry and Food Technology majors.

Credit, 2.

One 4-hour laboratory period.

Mr. HALE.

175. **ANIMAL BREEDING.**—Reproductive physiology, genetics.

Credit, 4.

Three 2-hour laboratory periods.

Mr. RICE.

176. **ANIMAL BREEDING TECHNIQUES.**—The practical application of the principles of physiology of reproduction and selection to the improvement of farm animals.

Credit, 1.

One 2-hour laboratory period.

Mr. COWAN.

178. **DAIRY CATTLE PRODUCTION.**

Credit, 4.

Four 2-hour laboratory periods.

Mr. FOLEY.

179. **HORSE AND SWINE PRODUCTION.**

Credit, 3.

2 class hours, one 2-hour laboratory period.

Mr. COWAN.

179A. **ADVANCED LIVESTOCK JUDGING.**—Beef, sheep, horse, and swine judging and selection. Field trips will be made to breeding establishments.

Credit, 1.
One 4-hour laboratory period.

Mr. COWAN.

Prerequisite, Animal Husbandry 156A or permission of instructor.

181. SEMINAR.—For Animal Husbandry majors. Credit, 1.
One 2-hour laboratory period. Mr. FOLEY.
182. SEMINAR.—For Animal Husbandry majors. Credit, 1.
One 2-hour laboratory period. Mr. Rice.
183. ADVANCED MEAT JUDGING.—A continuation of Course 172. Credit, 1.
One 4-hour laboratory period, first half of semester. Mr. HALE.
- Prerequisite, Animal Husbandry 172 and permission of instructor.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN.

- Bacteriology 185. IMMUNOLOGY. Credit, 3.
Miss GARVEY
- Chemistry 234. ADVANCED BIOCHEMICAL LECTURES. Credit, 3
Mr. TURNER.
- Zoology 220. EXPERIMENTAL EMBRYOLOGY. Credit, 3
Mr. WOODSIDE.
- Zoology 173. GENERAL CYTOLOGY. Credit, 3.
Mr. ROLLASON.
- ZOOLOGY 183. COMPARATIVE PHYSIOLOGY. Credit, 4.
Mr. BISHOP.
- ZOOLOGY 187. ENDOCRINOLOGY. Credit, 3.
Mr. SNEDECOR.

Bacteriology

RALPH L. FRANCE, major adviser.

Registration by permission of the Department. Prerequisite courses required of graduate students in bacteriology are general chemistry, quantitative and qualitative analysis, organic chemistry, and twelve semester hours of undergraduate bacteriology. Students who have not taken these courses as undergraduates will be required to fulfill these requirements here without graduate credit.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL PROBLEMS.—This course is designed especially to provide research experience for students who do not write a thesis. The problem will be carried out in the same manner as a thesis, except that it will be less extensive. A written report of the completed study will be required. A student who is working a thesis may elect this course for special studies not otherwise provided for in the curriculum. Credit, 3-6.
THE STAFF.

201. HISTORY OF BACTERIOLOGY.—Studies in the development of bacteriology from the late seventeenth century to the present time, especially planned to show the developments of bacteriology in relation to agriculture, public health, the arts, industry and medicine. Credit, 2.

Mr. LITSKY and Mr. FULLER.

202. BACTERIAL PHYSIOLOGY.—Lectures, literature reviews, and laboratory exercises in bacterial nutrition, metabolism and growth. The course includes a comprehensive survey of the nutritional requirements of bacteria, their enzyme systems and the chemical changes in substrates that result from enzyme action, and the resulting effect on bacterial growth.

Credit, 3-5.

THE STAFF.

203. BACTERIAL CYTOLOGY.—Lectures, literature reviews, and laboratory demonstrations, designed to give the student a comprehensive survey of the structure of bacterial cells and the functions of their components. Attention will be given to bacterial mutations.

Credit, 3-5.

MR. FULLER.

204. ADVANCED STUDIES OF SPECIAL BACTERIAL GROUPS.—This course is designed to consider bacterial groups that are not considered, or are given limited attention in other courses offered by the department. Special attention will be given to the autotrophic bacteria, such as nitrifying and nitrogen-fixing bacteria, as well as the sulfur and iron bacteria. The ecological relationships of bacterial associations will be included. The course will consist of lectures, literature reviews, and laboratory demonstrations.

Credit, 3-5.

MR. FULLER.

205. ADVANCED IMMUNOLOGY.—Consideration will be given to advanced theories and laboratory procedures basic to bacteriology, immunology, and serology.

Credit, 3-6.

Prerequisite, Bacteriology 185.

MISS GARVEY.

206. INDUSTRIAL BACTERIOLOGY.—Deals with various industrial processes involving bacterial changes. Specific organisms involved, procedure, chemistry of changes are discussed.

Credit, 3.

MR. CZARNECKI.

207. VIROLOGY.—A comprehensive study of viruses, including laboratory work covering methods for cultivation and identification. Limited to department majors, except by permission of the instructor.

Credit, 3.

MR. LITSKY.

208. SEMINAR.—Lectures and reports on current literature and special topics. (One each semester.)

Credit, 1-4.

MR. LITSKY and MR. FULLER.

211. ADVANCED BACTERIOLOGY.—For students majoring in other departments, not for bacteriology majors. Lectures and laboratory. A systematic study of pathogenic and non-pathogenic bacteria, disinfectants and anti-biotics.

Prerequisite, Bacteriology 210.

Credit, 3.

MR. CZARNECKI.

213. ANTIBIOTICS.—The historical background and theory of action of antibiotics are correlated with practical laboratory procedures used in the study of their isolation, methods of assay and effects on morphology and survival of bacteria.

Credit, 3.

Prerequisite, Bacteriology 51, 52, or equivalent.

MR. CZARNECKI.

214. ANTISEPTICS AND DISINFECTANTS.—This course is designed to give the student a critical evaluation of antiseptics and disinfectants and the procedures used in testing them. Practical aspects of these compounds are considered as to their general use. Studies of the various classes of antiseptics and disinfectants are to correlate chemical structure to antibacterial activity, mode of action, speed of action and specificity.

Credit, 3.

Prerequisite, Bacteriology 51, 52, or equivalent.

MR. LITSKY.

300. THESIS, Master's degree.

Credit, 10.

400. THESIS, Ph. D. degree

Credit, 30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

181. GENERAL APPLIED BACTERIOLOGY.—This course is designed to give the student a working knowledge of routine and special tests used in present day applied bacteriology. Subjects receiving consideration are: methods for determining the sanitary quality of milk and milk products, water and shellfish; eating and drinking utensils; and air. Credit, 4

Prerequisite, Bacteriology 31, 31A, or permission of instructor. Mr. FRANCE.

182. FOOD BACTERIOLOGY.—Consideration will be given to (1) bacteriological principles which apply to the preservation, fermentation, and spoilage of foods, (2) the sanitary examination of foods, (3) the causes of food poisoning and (4) microbiological assays. Credit, 3.

Prerequisite, Bacteriology 51, or permission of instructor. Miss GARVEY.

185. IMMUNOLOGY.—Admission by permission of the instructor. This course includes consideration of host reactions which favor the prevention and cure of disease; qualitative and quantitative estimations of toxins and antitoxins; the use of biological products such as antigens and immune sera in differential bacteriology and in disease diagnosis; and a consideration of isohemagglutinins as determinants of blood groups. Credit, 3.

Miss GARVEY.

190. SANITARY BACTERIOLOGY.—A detailed study of public health laboratory methods. Practical application of methods will be made through field studies. By permission of instructor. Credit, 3.

Mr. FRANCE.

192. CLINICAL LABORATORY METHODS.—This course is designated for students majoring in medical technology. The purpose of the course is to familiarize the student with routine clinical laboratory procedures. Credit, 3.

By permission of instructor. Mr. FRANCE.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Botany 166. GENERAL MYCOLOGY. Credit, 3.
Mr. BANFIELD.

Chemistry 251. SEMINAR. Credit, 1, each semester
Mr. RITCHIE.

Home Economics 211, 212. NUTRITION SEMINAR. Credit, 1, each semester
Miss MITCHELL.

Zoology 169. ANIMAL PARASITOLOGY. Credit, 3.
Miss TRAVER.

Zoology 248. PHYSIOLOGICAL GENETICS. Credit, 3.
Mr. RAUCH.

Public Health 164. MICROSCOPY OF WATER.	Credit, 3. Mr. SNOW.
Home Economics 203. ADVANCED NUTRITION—METABOLISM OF MAJOR FOOD-STUFFS.	Credit, 3. Miss MITCHELL.
Home Economics 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.	Credit, 3. Miss MITCHELL.
Home Economics 205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION	Credit, 3. Mrs. WERTZ.
Chemistry 234. ADVANCED BIOCHEMICAL LECTURES.	Credit, 3. Mr. TURNER.
Chemistry 235. BIOCHEMISTRY LABORATORY METHODS.	Credit, 3-5 each semester. Mr. TURNER.
Chemistry 236. ADVANCED BIOCHEMICAL ANALYSIS.	Credit, 3-5. Mr. TURNER.
Chemistry 237. BIOCOLLOIDS.	Credit, 3. Mr. TURNER.
Food Technology 210, 211. THERMAL PROCESSING OF FOODS.	Credit, 2, 1st semester. Credit, 3, 2nd semester. Mr. ESSELEN.
Food Technology 271, 272. SEMINAR.	Credit, 1-2 each semester. THE STAFF.

COURSES FOR MINOR CREDIT ONLY

151, 152. ADVANCED BACTERIOLOGY.—Studies on bacterial metabolism and the influence of environmental factors on growth and viability. The differentiation and identification of bacterial species by morphological, cultural, physiological, and serological studies. The combined courses not only give the students a comprehensive picture of the various forms of existing bacteria, but develop a special technique for the isolation, cultivation, and identification of both pathogenic and non-pathogenic species. Credit, 3 each semester.

By permission of instructor.

Miss GARVEY.

210. ADVANCED AND APPLIED TECHNIQUES IN BACTERIOLOGY.—Lectures and laboratory. The material offered in this course is designed to help fill in the student's general knowledge of the biological sciences. Emphasis will be placed on the position of bacteria in relation to other fields of science and on techniques that make it possible for the student to use bacteriology as a tool in his particular major field. Credit, 3.

Mr. CZARNECKI.

Botany

THEODORE T. KOZLOWSKI, major adviser

A thesis will be required of certain candidates for the M.S. in Botany.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL PROBLEMS.—Selected research problems in botany not related to the candidate's thesis. Credits, 1-5 per semester.

A. Plant Cytology and Genetics. Mr. SPENCER.

B. Plant Ecology. Mr. LIVINGSTON and Mr. GASIORKIEWICZ.

C. Plant Mycology. Mr. BANFIELD, Mr. GUBA and Mr. ———.

D. Plant Morphology. Mr. TORREY.

E. Plant Pathology.
Mr. BANFIELD, Mr. DORAN, Mr. GUBA, Mr. GASIORKIEWICZ.

F. Plant Physiology. Mr. KOZLOWSKI, Mr. JONES.

G. Plant Taxonomy. Mr. TORREY, Mr. LIVINGSTON.

202, 203. ADVANCED PLANT PHYSIOLOGY.—Advanced study on metabolism, water relations and mineral nutrition of plants. The course includes lectures, critical analyses of literature, reports and individual conferences. Given in alternate years. Credit, 4 each semester.

Mr. KOZLOWSKI.

Prerequisites, Botany 167 168 or equivalent;
Chemistry 151, 152 or equivalent.

204. FOREST PATHOLOGY.—A course dealing with the more common and important fungus diseases and with wood decay caused by saprophytic fungi which affect forest trees. Given in alternate years. Credit, 4.

Prerequisite, Botany 51 or equivalent. Mr. BANFIELD.

205, 206.—ADVANCED PLANT PATHOLOGY.—A study of biological problems that underlie the diseased state. Consideration is given to the general parasitological and epidermiological aspects of plant disease from the standpoint of critical examination of the variation in and interaction between host plants, parasites and environment. Given in alternate years. Credit, 2-4 each semester.

Prerequisites, Botany 51 and 166 or equivalent. Mr. BANFIELD.

207. ADVANCED PLANT ECOLOGY.—Lectures, conferences, critical reading and reports on advanced considerations of synecology and autecology. Given in alternate years. Credit, 3.

Mr. LIVINGSTON.

300. THESIS, MASTER'S DEGREE.—Research on an approved problem in plant ecology, morphology, pathology, physiology or taxonomy. Credit, 10

400. THESIS, PH. D. DEGREE.—Research on an approved problem in plant ecology, morphology, pathology, physiology or taxonomy.

Credit, 30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

158. **MICROTECHNIQUE.**—The preparation of microscopic mounts including the use of biological stains with the infiltration, celloidin and paraffin methods, and the use of slide and rotary microtomes. The rewards of careful work are improvement in manipulative technique, better orientation in the field of plant structures, an enhanced aesthetic appreciation and a valuable collection of microscopic mounts.

Credit, 2.

Mr. TORREY.

159, 160. **THE ANGIOSPERMS.** A study of the angiosperm orders from the standpoint of reproductive morphology, ecology, evolution, economics and history. Illustrative types are drawn from the State herbarium, while forms for laboratory dissection are supplied from greenhouses or from preserved materials. A course for horticulturalists as well as botanists. Given in alternate years, beginning, 1952-53.

Credit, 3-5 each semester.

Mr. TORREY.

161, 162. **COMPARATIVE ANATOMY OF GREEN PLANTS.**—The anatomy, evolution, and taxonomy of chlorophyllous plants, including extinct as well as living forms. Lectures interpret anatomical data in accord with such principles as algal tendencies and parallelisms, isomorphic and heteromorphic alternation, the landward migration, telome concept, rise and development of atracheates and tracheates, stelar evolution and wood anatomy, angiosperms as the ultimate evolutionary types. Given in alternate years, beginning 1953-54.

Prerequisite, one semester of cryptogamic botany.

Credit, 3 each semester.

Mr. TORREY.

163, 164. **COMPARATIVE MORPHOLOGY OF FUNGI.**—Comparative morphology, life history and habitat of representative species of important orders and families. Laboratory work includes collection, identification, and study of common local forms.

Credit, 3 each semester.

Mr. BANFIELD.

166. **GENERAL MYCOLOGY.**—A general course designed to acquaint the student with various classes of fungi, life history and morphology of representative species, their distribution in nature, their significance in plant and animal disease, and their utilization and industrial fermentations.

Credit, 3.

Mr. BANFIELD.

167, 168. **INTRODUCTORY PLANT PHYSIOLOGY.**—A study of the processes occurring in plants and their relation to the complex of activities constituting plant growth.

Credit, 3 each semester.

Mr. KOZLOWSKI.

175. **METHODS IN PLANT PATHOLOGY.**—A study of general techniques and specialized methods used in the investigation of plant diseases. Given in alternate years.

Credit, 3.

Prerequisite, one semester of plant pathology.

Mr. BANFIELD.

181. **PLANT ECOLOGY.**—The relationships of plants to environment including a study of environmental factors (autecology) and of plant communities (synecology).

Credit, 3.

Mr. LIVINGSTON.

182. **PLANT GEOGRAPHY.**—Lectures and assigned readings of descriptive and historical plant geography as well as basic principles governing the natural distribution of plants.

Credit, 2.

Mr. LIVINGSTON.

188. **PLANT CYTOGENETICS.**—The interpretation of hereditary phenomena in plants in terms of cell structures. A correlation of plant cytology and genetics which is of applied as well as theoretical importance. Credit, 3.
Prerequisite, Zoology 153. Mr. SPENCER.

190. **INSECT TRANSMISSION OF PLANT DISEASES.**—A lecture course on intricate interrelationships of insects and microorganisms, with particular emphasis on the basic role played by insects in inception, distribution and perpetuation of plant diseases. Credit, 3.
Mr. BANFIELD.

COURSES FOR MINOR CREDIT ONLY

151. **PLANT PATHOLOGY.**—A basic course in plant pathology dealing with the major cause and control of plant diseases. Attention is given to disease symptoms, infection and parasitism, agents and disease transmission, environmental effects on disease incidence and general principles in plant disease control. Credit, 3.
Mr. BANFIELD.

Chemistry

WALTER S. RITCHIE, major adviser.

The Department of Chemistry provides facilities for students intending to complete the requirements for the Master's degree and the Doctor's degree. Students accepted for graduate study are expected to have met the usual requirements for the Bachelor's degree. Those who have not fulfilled these requirements may be admitted on limited status until the deficiencies have been removed.

First year graduate students will take "placement" examinations during the first week of residence. These examinations are for the purpose of evaluating the background of the student, and to assist in the selection of a course of study. Students are admitted to candidacy for a degree only after the satisfactory passing of written comprehensive examinations, at which time thesis problems are assigned in the following fields of chemistry: physical, organic, inorganic, analytical and biochemical.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. **INORGANIC PREPARATIONS.—LABORATORY.**—The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Credit, 3-5.
Mr. SMITH.

202. **INORGANIC CHEMISTRY OF THE LESS FAMILIAR ELEMENTS.**—Lectures and collateral reading on the descriptive chemistry of some of the less familiar elements such as boron, gallium, indium, thallium, the lanthanides, fluorine, titanium, vanadium, tantalum, tungsten, and uranium. Correlations between structure or spatial configurations and chemical properties will be stressed to the extent permitted by modern data. Given in alternate years. Credit, 6.
Mr. ROBERTS.

203. **PHYSICAL CHEMICAL MEASUREMENTS.**—Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; percent hydrolysis of aniline hydrochloride from conductivity measurements;

solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; absorption of iodine by charcoal; determination of hydrogen ion concentration. To each student separate work will be assigned.

Credit, 3-5 each semester.

Prerequisites, Chemistry 165 and 166.

Mr. FESSENDEN and Mr. SMITH.

205. **CHEMICAL THERMODYNAMICS.**—The first and second laws of thermodynamics will be reviewed. The concept of the Boltzmann distribution and the partition function will be introduced, and the calculation of thermodynamic function from these quantities will be discussed. The calculation of equilibrium constants from both thermochemical and spectroscopic data will be considered, as will the application to electrochemistry and ionic equilibria.

Credit, 3.

Prerequisites, Chemistry 165 and 166.

Mr. STEIN.

206. **GASES, KINETICS, AND CATALYSIS.**—Some of the basic concepts of the kinetic theory of gases and the absorption of gases by solids will be discussed. The kinetics of homogeneous gas reactions and chain reactions will be considered as well as the theory of absolute reaction rates. Homogeneous and heterogeneous catalysis, photochemical, radiation induced reactions, and reactions in solution will be discussed.

Credit, 3.

Prerequisite, Chemistry 205 or its equivalent.

Mr. STEIN.

208. **CHEMICAL SPECTROSCOPY.**—This course is designed to give students practice in the use of spectroscopic equipment in solving chemical problems. The lecture work of the course will include discussions of (1) the design and use of instruments, (2) the elementary theory of spectra, and (3) the application of spectroscopy of chemical problems. The laboratory work will include practice in the use of the spectrometer and the spectrograph for the analysis of flame, arc, and spark spectra, and the use of the spectrophotometer for absorption measurements. Photographic procedures will be discussed and used in connection with the operation of the spectrograph. Given in alternate years.

Credit, 3.

Prerequisites, Chemistry 165 and 166, or equivalent.

Mr. SMITH.

210. **ATOMIC AND MOLECULAR THEORY.**—A consideration of the fundamental particles, natural and induced radioactivity, atomic theory based upon atomic spectra and the quantum theory, the nature of chemical binding and molecular theory. Given in alternate years.

Credit, 3.

Prerequisites, Chemistry 165, 166, 185, or equivalent.

Mr. SMITH.

211. **QUANTUM CHEMISTRY.**—The application of the quantum theory to chemical problems will be discussed. This will include a discussion of the exact theory for describing the structure of simple atoms, the application of approximate methods for complex atoms and molecules, the chemical bond, resonance, and the interaction of radiation and matter.

Credit, 3.

Prerequisites, Chemistry 186, or equivalent.

Differential Equations is desirable.

Given alternate years in Fall Semester (1953).

Mr. STEIN.

212. **PHYSICAL CHEMISTRY OF HIGH POLYMERS.**—Various aspects of the physical chemistry of natural and synthetic polymers will be discussed. Topics to be considered will include: structure of solid polymers, determination of molecular weights, sizes and shapes, mechanical properties of solid polymers, colligative properties of polymer solutions, polyelectrolytes, and physical chemistry of proteins.

Credits, 3.

Prerequisite, Chemistry 205 or equivalent.

Mr. STEIN.

Given alternate years in Spring Semester (1954).

221. **ADVANCED ANALYTICAL CHEMISTRY.**—Laboratory consisting of special work to meet the needs of the individual student. It may consist of ultimate analysis, electro-analysis, the analysis of definite classes of materials such as fertilizers, ores, insecticides, alloy or materials containing the rarer elements, and the use of organic reagents.

Credit, 3-5 each semester.

Prerequisite, 183 or equivalent.

Mr. ROBERTS.

223. **INTRODUCTION TO MICRO-CHEMISTRY.**—Laboratory. Designed to illustrate the applications of micro technique to synthesis, analysis, and characterization. The microscopic work may include the optics of the microscope, micrometry, the microscopic study of fibers, crystals, and physiochemical phenomena and an introduction to microscopical qualitative analysis. The quantitative work may include the determination of carbon, hydrogen, nitrogen, and halogen in organic materials and selected inorganic determinations.

Credit, 3-5 each semester.

Prerequisite, Chemistry 183, or equivalent.

Mr. ROBERTS.

227. **HETEROCYCLIC CHEMISTRY.**—The chemistry of the common organic heterocyclic compounds containing nitrogen, oxygen, and sulfur. Includes considerations of mechanisms of the reactions discussed.

Three class hours

Credit, 3.

Prerequisite, Chemistry 181 or equivalent.

Mr. CANNON.

229, 230. **THEORETICAL ORGANIC CHEMISTRY.**—Lectures on special topics such as stereochemistry, bond formation, resonance, ionic reactions, free radical reactions, transition state theory, reaction mechanisms, molecular rearrangements, etc. Given in alternate years.

Credit, 3 each semester.

Prerequisite, Chemistry 181 or its equivalent.

Mr. CANNON.

Chemistry 181 may be taken simultaneously with Chemistry 229.

231. **ADVANCED ORGANIC CHEMISTRY.**—Laboratory. More difficult synthesis of organic compounds will be assigned to the individual student. These compounds will frequently be those desired as starting materials for research. Their preparation will require the use of the original literature.

Credits, 3-5.

Prerequisite, a year course in Organic Chemistry. Mr. CANNON and Mr. RITCHIE.

232. **ORGANIC CHEMISTRY.**—An intensive survey of certain reactions of organic chemistry with emphasis on their scope and limitations, recent developments, and theoretical aspects. Given every other year, alternating with Chemistry 230.

Credit, 3.

Prerequisite, Chemistry 181.

Mr. CANNON.

234. **ADVANCED BIOCHEMICAL LECTURES.**—Lectures on recent developments in the chemistry of proteins, lipids, carbohydrates, enzymes, and other materials of biological significance.

Credits, 3.

Mr. LITTLE.

235. **BIOCHEMISTRY LABORATORY METHODS.**—Advanced laboratory work on preparation, examination, and analytical techniques for protein, carbohydrate, lipids, enzymes, etc. Methods of colloid chemistry will be included. Individual problems and work will be assigned as far as possible to meet individual requirements.

Credit, 3-5 each semester.

Mr. LITTLE.

236. **ADVANCED BIOCHEMICAL ANALYSIS.**—Advanced laboratory course in analytical methods applicable to naturally occurring materials including foods, feeds, etc. Research methods and techniques will be introduced as well as routine methods.

Credit, 3-5.

Mr. LITTLE.

237. **BIOCOLLOIDS.**—A consideration of the fundamental principles of colloidal behavior and some applications to industry, agriculture, and biology. Credit, 3.
Prerequisite, Chemistry 152, or equivalent. Mr. BENNETT.

239. **CHEMISTRY OF NATURAL PRODUCTS.**—The lectures and collateral readings will deal with the chemistry of some classes of natural compounds which are of biochemical and economic interest. Proteins, the sugars, starch, cellulose, polyuronides, lignin, glucosides, alkaloids, enzymes, purines, pyrimidines, and pigments will be considered. Credit, 2.
Mr. LITTLE.

251. **SEMINAR.**—Conferences, reports, or lectures. Credit, 1 each semester.
Maximum credit, 2.
Mr. RITCHIE.

300. **THESIS, MASTER'S DEGREE.**—The preparation of an acceptable thesis in agricultural, analytical, inorganic, organic, biochemical, or physical chemistry, under the direction of the professor in charge of the work. Credit, 10.

400. **THESIS, PH. D. DEGREE.**—The preparation of an acceptable thesis in agricultural, analytical, inorganic, organic, biochemical or physical chemistry, under the direction of the professor in charge of the work. Credit, 30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

177. **ADVANCED PHYSICAL CHEMISTRY.**—A detailed study of a number of topics such as kinetics, catalysis, chemical thermodynamics and electrochemistry. Three class hours. Credit, 3.
Mr. STEIN.

Prerequisites, Chemistry 165 and 166.

181. **ORGANIC CHEMISTRY.**—A rapid and intensive survey of the important reactions of organic chemistry with emphasis on their scope and limitations, recent developments and theoretical aspects. Credit, 3.
Three class hours. Mr. CANNON.

182. **QUALITATIVE ORGANIC CHEMISTRY.**—The characterization of organic compounds by means of physical properties, class reactions, and the preparation of suitable derivatives. Credit, 4.
Two class hours; two 3-hour laboratory periods. Mr. CANNON.

183. **ADVANCED QUANTITATIVE ANALYSIS.**—The laboratory work will include representative determinations in electrolytic and electrometric methods, and an introduction to colorimetry and other optical methods of analysis. Credit, 3.
Two class hours; one 3-hour laboratory period. Mr. ROBERTS.
Prerequisite, Chemistry 130.

186. **THEORETICAL INORGANIC CHEMISTRY.**—Atomic structure, periodic classification and relationships, valence concepts, acid-base theory, and the chemistry of the commercially important elements and their compounds based upon the periodic table. Credit, 3.
Three class hours. Mr. SMITH.
Prerequisite, Chemistry 165.

188. **HISTORY OF CHEMISTRY.**—An historical and biographical study of chemistry and chemists. Credit, 3.
Three class hours. Mr. RITCHIE.

192. INTRODUCTION RESEARCH.—Admission only by permission of the department.

10 laboratory periods.

Credit, 5.

Hours by arrangement.

THE STAFF.

193, 194. GENERAL BIOCHEMISTRY.—These courses offer a broad introduction to the general field of biochemistry for students majoring in chemistry or in the biological sciences and provide a background for more advanced or specialized study in this field. A competent preparation in organic chemistry is required. (Chemistry 51 and 52 or their equivalent.)

Credit, 5 each semester.

Three class hours; two 3-hour laboratory periods.

Mr. LITTLE.

COURSES FOR MINOR CREDIT ONLY

(For chemistry majors)

151, 152. ORGANIC CHEMISTRY.—A course in the theory of organic chemistry intended to serve the needs of students who will specialize in chemistry, as well as those who may specialize in other fields.

Credit, 4.

Three class hours; one 3-hour laboratory period.

Mr. RITCHIE and Mr. CANNON.

163. CHEMISTRY OF WATER, SEWAGE, AND SEWAGE SLUDGE.—The preparation of reagents and standard methods for the analysis of water, sewage, and sewage sludge.

Credit, 3.

Two 3-hour laboratory periods.

Mr. ———.

Prerequisite, Chemistry 30.

165, 166. PHYSICAL CHEMISTRY.—A study of the fundamental theories and laws of physical chemistry.

Credit, 4.

Three class hours; one 3-hour laboratory period.

Mr. FESSENDEN and Mr. SMITH.

179. BIOCHEMISTRY.—An introduction to general biochemistry and physiological chemistry, with particular emphasis on the extension of fundamental organic chemistry to materials and processes of biological significance; proteins, lipids, carbohydrates, enzymes.

Credit, 4.

Three class hours; one 3-hour laboratory period.

Mr. LITTLE.

Prerequisite, Organic Chemistry.

180. CLINICAL CHEMISTRY.—(Blood and Urine Analysis). The collection and preparation of samples for analysis; standardization of glassware and the preparation of reagents; description of colorimeters and the determination of certain significant compounds in the samples. The latter group will include at least sugars, proteins, non-protein, nitrogen, fatty substances and inorganic elements.

Credit, 3.

One class hour; two 2-hour laboratory periods.

Mr. LITTLE.

Civil Engineering

MERIT P. WHITE, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

252. STRUCTURAL DYNAMICS.—This course covers the behavior of simple and complex oscillating systems. It deals particularly with the behavior of structures

subjected to periodic forces, to non-periodic forces and to shock loads. Behavior beyond the elastic range is included.

Credit, 3.

Prerequisites, C.E. 51 and 52.

Mr. WHITE.

261. MATERIALS TESTING TECHNIQUES.—This course is concerned with the machines and auxiliary equipment used in experimental stress analysis for purposes of research.

Credit, 3.

Prerequisite, C.E. 51.

Mr. WHITE.

270. ADVANCED STRUCTURAL THEORY II.—Advanced problems in structural analysis are presented in this course. Topics considered are the analysis of complex rigid frames; influence lines for indeterminate structures; the placing of loading and the determination of stress in continuous building frames; secondary stresses; limit design.

Credit, 3.

Prerequisite, C.E. 172.

Mr. OSGOOD.

271. ARCH ANALYSIS.—Methods of analyzing two-hinged and hinged arches. A design project is included.

Credit, 3.

Prerequisites, C.E. 70 and 71.

Mr. GABRYS.

275. ADVANCED FLUID MECHANICS I.—Theory of hydraulic similtude, dimensional analysis, methods of obtaining dynamic similarity in hydraulic models in actual practice, analysis of typical hydraulic models.

Credit, 3.

Prerequisite, C.E. 75 or 76.

THE STAFF.

277. ADVANCED SANITARY ENGINEERING I.—This course treats problems encountered in the design and operation of water supply and sewage disposal systems.

Credit, 3.

Prerequisite, C.E. 77, 78.

Mr. FENG.

279. THEORETICAL SOIL MECHANICS.—A thorough investigation of the phenomena in soil masses subjected to such forces as seepage, frost, and imposed loads.

Credit, 3.

Mr. HENDRICKSON.

280. APPLIED SOIL MECHANICS.—The solution of case problems applying the principles of soil mechanics to the design of embankments, retaining walls, footings, raft foundations, and pile structures.

Credit, 3.

Prerequisites C.E. 279.

Mr. HENDRICKSON.

300. RESEARCH AND THESIS, Master's degree.

Credit, 6.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

172. ADVANCED STRUCTURAL THEORY I.—Methods of analyzing statically indeterminate structures.

Credit, 3.

Prerequisite, C.E. 70.

Mr. OSGOOD.

188. ADVANCED STRESS ANALYSIS.—Determination of stresses and strains in elements of machines and structures.

Credit, 3.

Prerequisite, C.E. 51 with grade of 75.

Mr. WHITE.

Dairy Industry

D. J. HANKINSON, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. PROBLEMS IN DAIRY TECHNOLOGY.—A course for individual study in which the student gives attention to specific current problems involved in the processing of dairy products. Credit, 3.

Mr. HANKINSON.

202. ADVANCED DAIRY CHEMISTRY.—A study of the physical, colloidal, and chemical properties of dairy products; the role of milk fat, salts, proteins, carbohydrates, and enzyme systems, and their relation to dairy research. Credit, 3.

Two 1-hour lectures, one 3-hour laboratory period.

Prerequisite, 175 or equivalent.

Mr. NELSON.

209, 210. SEMINAR.—Reports on current literature. Credit, 1 each semester.

Mr. HANKINSON.

300. THESIS, Master's degree.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

175. DAIRY CHEMISTRY.—Physical and chemical principles which explain the behavior of milk and milk products in the various technological operations. Constituents of milk in relation to other organic compounds; physiochemical aspects of certain dairy phenomena such as foaming, coagulation, etc. The laboratory work will include many of the tests used commercially as well as in dairy research, emphasizing the principles and application of both qualitative and quantitative analysis as well as the technique of operating scientific apparatus. Credit, 3.

Enrollment by permission of instructor.

Mr. NELSON.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN.

No more than two courses may be selected from the following list of courses:

Home Economics 203. ADVANCED NUTRITION.—Metabolism of major food-stuffs. Credit, 3.

Miss MITCHELL.

Home Economics 204. ADVANCED NUTRITION.—Minerals and vitamins.

Credit, 3.

Miss MITCHELL.

Bacteriology 202. BACTERIAL PHYSIOLOGY.

Credit, 3-5.

THE STAFF.

Chemistry 165, 166. PHYSICAL CHEMISTRY.

Credit, 4 each semester.

Mr. FESSENDEN and Mr. SMITH.

Chemistry 193, 194. GENERAL BIOCHEMISTRY.

Credit, 5 each semester.

Mr. TURNER.

Chemistry 237. BIOCOLLOIDS.

Credit, 3.
Mr. TURNER

Food Technology 210. THERMAL PROCESSING OF FOODS.

Credit, 2.
Mr. ESSELEN.

Food Technology 221. EDIBLE FATS AND OILS.

Credit, 3.
Mr. ANDERSON.

COURSES FOR MINOR CREDIT ONLY

152. MARKET MILK.—A study of the various phases of the market milk industry; sanitary production, transportation, pasteurization, and handling in the city plant; marketing, delivery systems, milk and its relation to public health, inspection, milk laws, food value and advertising. Cultured milk and other milk drinks are also included. Some milk plants are visited. Credit, 4.

Mr. LINDQUIST.

177. BUTTER AND CHEESE MAKING.—Half of the semester is devoted to butter making; the remainder to cheese making, condensed and powdered milk. The various phases of the butter industry studied are: separators and cream separation; pasteurization, neutralization, and ripening of cream; preparation of started cultures; churning; marketing and scoring of butter; creamery management. The work in cheese making includes cheddar, cream, Neufchatel, cottage, processed cheeses, etc. The manufacture of condensed milk, powdered milk, and commercial casein are also covered. Credit, 4.
Prerequisite, Dairy 25 or permission of instructor.

Mr. LINDQUIST, Mr. NELSON, and Mr. FINNEGAN.

178. ICE CREAM MAKING.—The principles and practices of ice cream making. The effects of such factors as composition, quality, pasteurization, homogenization, aging, and freezing on the finished product are considered. Sherbets, ices, fancy and individual forms, and all flavors of ice cream are studied. Some time is devoted to refrigeration, machinery, delivery equipment, and merchandising methods as they are related to the industry. Credit, 4.

Prerequisite, Dairy 25 or permission of instructor.

Mr. NELSON.

Economics

PHILIP L. GAMBLE, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL STUDIES IN ECONOMICS.—The student undertakes a special project under the guidance of a member of the department.

Credit, 2-5 each semester.

THE STAFF.

210. HISTORY OF ECONOMIC THOUGHT.—A general study of economic thought from its ancient beginnings; the contributions of the various schools; recent changes in economic thought. Given as required.

Credit, 3.

Mr. HALLER.

213. CENTRAL BANKING.—A study of the organization and policies of the major central banks with special reference to the Federal Reserve System. Given as required.

Credit, 3.

Mr. GAMBLE.

227. **MATHEMATICAL ECONOMICS AND ECONOMIC MODEL-BUILDING.**—A study of the various modern applications of mathematics to economic analysis. Special attention is paid to the analysis of interactions among several variables. Both static and dynamic processes will be examined.

Admission by consent of instructor.

Credit, 3.

Given as required.

Mr. SCHOEFFLER.

Prerequisite, Economics 173 and Mathematics 29 or the equivalent.

260. **MONOPOLY AND PUBLIC UTILITY PROBLEMS.**—A study of the problem of social control of monopolies and industries affected with a public interest.

Given as required.

Credit, 3.

Prerequisite, Economics 170.

Mr. HALLER.

272. **ADVANCED ECONOMIC THEORY.**—A study of the various theories of value and distribution.

Credit, 3.

Prerequisite, Economics 173.

THE STAFF.

293, 295, 297. **COURSES IN AGGREGATIVE ECONOMICS.**—(These courses rotate but not in a consistent cycle.)

293. **ECONOMIC PLANNING.**—Various economic plans in effect or proposed throughout the world. Appraisal of the technique of economic planning.

Credit, 3.

Mr. MORRIS.

295. **FULL EMPLOYMENT.**—Methods of attaining and maintaining full employment in economy.

Credit, 3.

Mr. GAMBLE.

297. **ECONOMIC FLUCTUATIONS.**—Causes, and methods of control of economic fluctuations.

Credit, 3.

Mr. SCHOEFFLER.

294. **INSTITUTIONAL ECONOMICS.**—Study of the major institutions affecting economic problems. Given as required.

Credit, 3.

Mr. HOWARD.

300. **THESIS**, Master's degree.

Credit, 10.

400. **THESIS**, Ph. D. degree.

Credit, 30

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

Added work required of graduates: (a) extra readings on same or additional assignments, (b) term paper, (c) special problem or project.

155. **ECONOMICS OF CONSUMPTION.**—A study of patterns of consumption, standards of living and the sources and expenditure of individual and family incomes.

Credit, 3.

(a and b or c)

Mr. HALLER.

156. **BUSINESS CYCLES.**—A study of business fluctuations and an analysis of current business cycle theories.

Credit, 3.

Mr. SCHOEFFLER.

165. **CORPORATION FINANCE.**—An introductory course in business finance concerned with forms of ownership organization, the nature and uses of cor-

porate securities, provision and maintenance of capital, financial expansion, and corporate reorganization. Credit, 3.

(a, c) Mr. KIMBALL.

170. MONOPOLIES.—A study of the growth, development and social control of monopolies. Credit, 3.

(a, b) Mr. HALLER.

174. CURRENT ECONOMIC PROBLEMS.—An intensive study of current economic problems. Students will be encouraged to pursue lines of individual interest. Credit, 3.

(a, b) Mr. HOWARD.

177. INTERNATIONAL TRADE.—A study of the policies, principles, and practices of international trade. Credit, 3.

(a, b) Mr. WEINER.

178. PUBLIC FINANCE.—A study of the principles underlying public expenditures, public borrowing and taxation. Credit, 3.

(a, b) Mr. GAMBLE.

180. LABOR LEGISLATION.—A study of federal and state legislation affecting labor. Credit, 3.

(a, b) Mr. MORRIS.

183. SOCIAL CONTROL OF BUSINESS.—Methods of social control of economic activity including both formal and informal controls. Credit, 3.

(a, b) Mr. HOWARD.

184. COMPARATIVE ECONOMIC SYSTEMS.—An examination of the various forms of economic organization that have been tried and proposed with an analysis of the economic institutions of representative current economies. Credit, 3.

Mr. SCHOEFFLER.

191, 192. SEMINAR. Credit, 1-3.

THE STAFF.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agricultural Economics 204. RESEARCH METHODS AND PROCEDURES. Credit, 3.

Mr. LINDSEY.

Agricultural Economics 156. FUNDAMENTALS OF COOPERATION. Credit 3.

Mr. LINDSEY.

Agricultural Economics 171. AGRICULTURAL ECONOMIC THEORY. Credit, 3.

Mr. LINDSEY.

Agricultural Economics 178. PRINCIPLES AND PROBLEMS OF LAND ECONOMICS. Credit, 3.

Mr. LINDSEY.

Agricultural Economics 180. ADVANCED STATISTICS. Credit, 3.

Mr. LINDSEY and Mr. RUSSELL.

Agricultural Economics 189, 190. PROBLEMS IN AGRICULTURAL ECONOMICS. Credit, 2-3.

Mr. LINDSEY and Mr. RUSSELL.

COURSES FOR MINOR CREDIT ONLY

225. **APPLIED ECONOMICS.**—A course offered primarily for high school teachers (others may elect), which is intended to appraise such current economic questions as the business cycle, taxation, banking, international trade reparations, economic planning, and similar problems in the light of economic principles. Credit, 3.

Mr. GAMBLE.

153. **MONEY, BANKING AND CREDIT.**—A critical survey of the development and operation of the monetary and banking systems of the United States.

(a) Credit, 3.

Mr. GAMBLE.

173. **MODERN ECONOMIC THEORY.**—A study of current theories about value, distribution and prices. Credit, 3.

(c) Mr. MORRIS.

179. **LABOR PROBLEMS.**—An analysis of the background and character of the modern labor problem with special references to the United States. Credit, 3.

(a and b or c) Mr. MORRIS.

Education

ALBERT W. PURVIS, major adviser.

Before being admitted to full status for the Master's degree with a major in Education, the student must have, in addition to minimum Graduate School requirements:

1. Fifteen hours of such fundamental courses as Education 51, 52, 53, 61, 62, 66, 72, 83, 85, etc., listed in the undergraduate catalogue.
2. Experience in teaching. Students entering without teaching experience must arrange for practice teaching as soon as possible.
3. If the major is in secondary education, a major (24 hours) and a minor (12 hours) in the subject-matter fields to be taught.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. **PROBLEM.**—Work necessary to achieve an answer to a particular question in the educational field. Question to be of student's choosing, if possible. It may or may not involve original research and usually has only local significance. This may be chosen instead of a thesis. A bound copy of the written report must be provided for the Department by the student. Credit, 3-6.

Prerequisite, Education 291. THE STAFF.

208. **THE TEACHER AND SCHOOL ADMINISTRATION.**—Problems in admission, promotion, personnel, discipline, extra-curricular activities, supervision, tenure, salary schedules, etc. Credit, 2-3.

Mr. PURVIS.

209. **ADMINISTERING SECONDARY SCHOOLS.**—Housing, finance, schedule, the library, guidance, cafeteria, public relations. etc. Credit, 2-3.

Mr. OLIVER.

210. **ADMINISTERING EXTRA-CURRICULAR ACTIVITIES.**—Scheduling, financing, sponsorship, regulation of pupil participation. (1952 and each alternate year.) Credit, 2-3.

Mr. OLIVER.

211. COMMUNITY RELATIONS FOR SCHOOL PERSONNEL.—Emphasis is placed on the development of good public relations policies and are techniques of assisting lay people in interpreting school activities, policies and objectives. (1953-54 and each alternate year.)
Credit, 2-3.
Mr. OLIVER.

213. ADMINISTERING ELEMENTARY SCHOOLS.—The principal's responsibilities, organization of the school office, scheduling, use of school facilities, curriculum organization, staff relationships, and the place of the school in the community.
Credit, 2-3.
Mr. McCARTHY.

214. SUPERVISING ELEMENTARY SCHOOLS.—Principles and problems of supervision in the elementary school; methods and types of supervision as they are related to the modern elementary curriculum, the content fields, the activity program and the area of unitary teaching.
Credit, 2-3.
Mr. McCARTHY.

215. SEMINAR IN EDUCATION.—Group study of current problems in curriculum, administration, supervision, etc., for school personnel in service.
Credit limited to two in any one semester.
Credit, 2-6.
THE STAFF.

220. SCHOOL LAWS OF MASSACHUSETTS.—A review of the legal relations of the school personnel covering the usual experiences in school and community, presented in a series of selected cases having the support of court decisions.
Credit, 3.
Mr. PURVIS.

267. AUDIO-VISUAL LABORATORY.—Individual and practical experience in setting up and using common Audio-Visual equipment and materials. Minor repairs and maintenance will be included. This course should be preceded by Education 166 or a similar course.
Credit, 2-3.
Mr. WYMAN.

291. EDUCATIONAL RESEARCH.—The principles and methods of research with special emphasis upon the technique used in Education. Statistics are studied chiefly from the standpoint of reporting and understanding the results of research. Required in first semester of students who anticipate completion of a thesis or problem in the current year.
Credit, 2.
Mr. PURVIS.

300. THESIS, MASTER'S DEGREE.—A completed piece of work on some specific aspects of the educational field with necessary review of the literature pertaining to it. Original research is expected and the study should have more than local significance.
Credit, 8.
Prerequisite, Education 291.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For major or minor credit)

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|--|-----------------------------|
| 151. HISTORY OF EDUCATION. | Credit, 2-3.
Mr. PURVIS. |
| 153. EDUCATIONAL TESTS AND MEASUREMENTS. | Credit, 2-3.
Mr. ROURKE. |
| 160. ELEMENTARY SCHOOL CURRICULUM. | Credit, 2-3. |
| 163. PRINCIPLES OF ELEMENTARY EDUCATION. | Credit, 2-3. |

166. PREPARATION AND USE OF AUDIO-VISUAL AIDS. Credit, 2-3.
Mr. WYMAN.
172. VOCATIONAL EDUCATION IN AGRICULTURE.—By arrangement. Credit, 3.
Mr. OLIVER and Mr. TAFT.
173. APPRENTICE TEACHING IN AGRICULTURE.—One full year of teaching
vocational agriculture off campus. By arrangement. Credit, 6.
Mr. OLIVER and Mr. TAFT.
175. TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE. By arrangement.
Credit, 3.
Mr. OLIVER and Mr. TAFT.
183. PRINCIPLE OF SECONDARY EDUCATION. Credit, 2-3.
Mr. MCCARTHY.
188. SECONDARY SCHOOL CURRICULUM. Credit, 2-3.
Mr. ROURKE.

COURSES FOR MINOR CREDIT ONLY

152. PRINCIPALS AND METHODS OF TEACHING. Credit, 3.
Mr. MCCARTHY.
161. ELEMENTARY READING AND LANGUAGE ARTS. Credit, 3.
Mr. _____
162. ELEMENTARY ARITHMETIC AND SCIENCE. Credit, 3.
Mr. _____
185. OBSERVATION AND PRACTICE TEACHING. By arrangement. Credit, 3.
THE STAFF

Electrical Engineering

ROBERT R. BROWN, major adviser.

POWER OPTION

First Semester

Second Semester

REQUIRED COURSES

- | | |
|--|---|
| E.E. 201. ENGINEERING ANALYSIS I. | E.E. 202. ENGINEERING ANALYSIS II. |
| E.E. 221. POWER AND MACHINERY
LABORATORY. | E.E. 222. POWER SYSTEMS METERING
AND RELAYING. |
| E.E. 300. GRADUATE RESEARCH. | E.E. 300. GRADUATE RESEARCH. |

ELECTIVES IN ELECTRICAL ENGINEERING

- | | |
|---|---|
| E.E. 183. TRANSIENT ANALYSIS. | E.E. 176. PUBLIC UTILITIES. |
| E.E. 185. ELECTRICAL MEASURE-
MENTS. | E.E. 182. POWER APPLICATIONS. |
| E.E. 191. SERVOMECHANISMS I. | E.E. 184. INDUSTRIAL ELECTRONICS. |
| E.E. 223. TRAVELING WAVES. | E.E. 188. POWER DISTRIBUTION. |
| | E.E. 196. ELECTRICAL DESIGN. |
| | E.E. 204. SERVOMECHANISMS II.
AND STABILITY. |
| | E.E. 224. POWER SYSTEMS OPERATION |

ELECTRONICS AND COMMUNICATIONS OPTION

*First Semester**Second Semester*

REQUIRED COURSES

E.E. 201. ENGINEERING ANALYSIS I.	E.E. 202. ENGINEERING ANALYSIS II.
E.E. 241. COMMUNICATIONS NETWORKS.	E.E. 242. VACUUM TUBE CIRCUITS.
E.E. 300. GRADUATE RESEARCH.	E.S. 300. GRADUATE RESEARCH.

ELECTIVES IN ELECTRICAL ENGINEERING

E.E. 183. TRANSIENT ANALYSIS.	E.E. 176. PUBLIC UTILITIES.
E.E. 185. ELECTRICAL MEASUREMENTS.	E.E. 184. INDUSTRIAL ELECTRONICS.
E.E. 191. SERVOMECHANISMS I.	E.E. 194. U.H.F. TECHNIQUES.
E.E. 243. ELECTROMAGNETIC ENGINEERING.	E.E. 196. ELECTRICAL DESIGN.
	E.E. 198. TELEVISION.
	E.E. 246. ELECTROMECHANICAL SYSTEMS.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. ENGINEERING ANALYSIS I.—Analytical procedure beyond undergraduate levels as applied to the solutions of problems in the various fields of engineering. Credit, 3.

Prerequisite, B.S. in engineering.

Mr. ROYS and STAFF.

202. ENGINEERING ANALYSIS II.—A continuation of 201. Credit, 3.

Prerequisite, E.E. 201.

Mr. ROYS and STAFF.

204. SERVOMECHANISMS II.—A continuation of E.E. 191. that covers the principles of quantitative dynamic analyses of closed-cycle control systems in terms of differential equations and complex functions. System synthesis on the basis of specified performance characteristics also is a major objective

Credit, 3.

Prerequisite, E.E. 191.

Mr. BROWN and Mr. MOHN.

221. POWER AND MACHINERY LABORATORY.—This is designed to develop testing techniques through class and laboratory studies of the more advanced topics related to electrical machinery and power systems. When taken concurrently with other courses in power and machinery, the laboratory work may be varied to suit individual needs.

Credit, 3.

1 class hour; 6 hours of laboratory.

Mr. WILSON.

Prerequisite, E.E. 81.

222. POWER SYSTEMS METERING AND RELAYING.—This course covers metering and protective relaying for electric power systems, and includes modern relay methods used on radial lines, loops and networks, with emphasis upon coordinated protection; circuit interruption problems also are studied. Credit, 3.

Prerequisite, E.E. 86.

Mr. BROWN.

223. TRAVELING WAVES IN POWER SYSTEMS.—The fundamental theory of traveling waves and its application to lightning and switching surges in power systems, including reflection and refraction at transition points; insulation levels and coordination; high voltage and current and voltage surge testing standards. Prerequisites, E.E. 183 and 86.

Credit, 3.

Mr. ROYS and Mr. WILSON.

224. **POWER SYSTEMS OPERATION AND STABILITY.**—A continuation of F.E. 86. with further applications to power systems under unbalanced steady state and transient conditions. This includes the effects of ground wires, ground impedance and mutual coupling impedances; inductive coordination with communication systems; the effects of saturation and pole saliency in synchronous machines upon steady state and transient stability; variability of load impedance; and multimachine problems. Credit, 3.

Prerequisite, E.E. 86 and 223.

Mr. WILSON.

241. **COMMUNICATIONS NETWORKS.**—A continuation of E.E. 79. which includes the Foster Reactance Theorem, the matrices of four-terminal systems and the principles of network synthesis with emphasis upon physical realizability and stability. Applications are made to the analysis and design of filters, equalizers, feedback networks and to other frequency-responsive systems. Credit, 3.

Prerequisite, E.E. 79.

Mr. ROYS.

242. **VACUUM TUBE CIRCUITS.**—A continuation of E.E. 80. consisting of the analysis and design of power and high frequency amplifiers and oscillators; the series expansion for plate current through impedance loads; high and low level modulation and detection; linear and square-law detection; multivibrators, trigger, clamping, computer and gate circuits; and square wave and pulse testing. Credit, 3.

Prerequisite, E.E. 80.

Mr. ROYS.

243. **ELECTROMAGNETIC ENGINEERING I.**—The fundamentals of Electromagnetism, including Ampere's and Faraday's Laws, Gauss' Theorem, retarded potential and Hertz' vector, Maxwell's equations and Poynting's vector. These are applied to the propagation, reflection and refraction of electromagnetic waves, radio-frequency lines, wave guides, cavity resonators, antennas and ionospheric reflections. Credit, 3.

Prerequisite, E.E. 194.

Mr. ROYS.

246. **ELECTROMECHANICAL SYSTEMS AND TRANSDUCERS.**—A review of network theory as associated with lumped mechanical systems, vibrating membranes and plates, electromechanical converters and acoustics. Applications are made to microphones, loudspeakers, horns, crystals and electromechanical filters. Credit, 3.

Prerequisite, E.E. 183.

Mr. ROYS.

300. **THESIS, MASTER'S DEGREE. GRADUATE RESEARCH.**—Independent research under the supervision of a staff member which will serve as the basis for the thesis required for the master's degree in Electrical Engineering. It is expected that a paper covering the project will be presented before the combined A.I.E.E. and I.R.E. student branch at the University. Credit, 3-6.

Consultation and laboratory hours to be arranged.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

176. **PUBLIC UTILITIES.**—This course considers the organization, administration and economics of public utilities, with emphasis upon electric power companies; it includes financing, rate studies, power contracts, public service commission regulations and other related topics. Credit, 3.

Mr. BROWN.

182. **POWER APPLICATIONS IN INDUSTRY.**—A study of industrial applications of electrical machines including power supplies to industrial plants, load require-

ments, types of drives, mechanical requirements of variable speed drives, torque relations in D-C and A-C motors, motor applications and control, and selsyn systems.

Credit, 4.

3 class hours; one 3-hour laboratory period.

Mr. WILSON.

Prerequisite, E.E. 81.

183. TRANSIENT ANALYSIS.—A study of the transient behavior of electrical, mechanical and thermal systems. This includes the formulation of the ordinary and partial differential equations of dynamic systems, and their solution by the classical and Heaviside methods and by Fourier and Laplace transforms.

Prerequisites, E.E. 42 and 57.

Credit, 3.

Mr. ROYS.

184. INDUSTRIAL ELECTRONICS.—Special characteristics of the electron tubes of industry; the theory, design and operation of commercial types of equipment utilizing these tubes, including stroboscopes, grid-controlled and polyphase rectifiers, inverters, welding controllers, speed and voltage regulators, high frequency heating circuits, etc.

Credit, 4.

3 class hours; one 3-hour laboratory period.

Mr. ROYS.

Prerequisite, E.E. 55.

185. ELECTRICAL MEASUREMENTS.—A study of the theory and practice of electrical and magnetic measurements and measurement devices; emphasis is placed on accuracy, precision, and limitations.

Two class hours; one 3-hour laboratory period.

Credit, 3.

Mr. ROYS.

188. ELECTRIC POWER DISTRIBUTION.—This course consists of a study of the particular problems relating to the distribution of electric power. Some of the topics considered are radial and loop systems, automatic load transfer, voltage regulation, and short circuit protection.

Credit, 3.

Prerequisite, E.E. 58.

Mr. WILSON.

191. SERVOMECHANISMS I.—This is a study of basic types of error-sensitive control systems; proportional, differential and integral controllers; transient behavior; criteria for error-free operation; and practical electrical and mechanical systems. Classical methods of analysis will be employed.

Credit, 4.

3 class hours; one 3-hour laboratory period

Mr. BROWN.

Prerequisites, E.E. 57 or M. E. 185.

194. ULTRA-HIGH-FREQUENCY TECHNIQUES.—This course is a study of U.H.F. oscillators, amplifiers, transmitters, receivers, transmission systems and antennas; multi-vibrators, trigger and gate circuits, electronic switches and controls.

3 class hours; one 3-hour laboratory period.

Credit, 4.

Prerequisite, E.E. 57 and 58.

Mr. BROWN.

196. PRINCIPLES OF ELECTRICAL DESIGN.—The fundamentals of electric, dielectric, magnetic and heat-flow systems as applied to the design, rating and life of coils, transformers, machinery and other electrical equipment.

Credit, 3.

2 class hours; one 3-hour laboratory period.

Mr. ROYS.

Prerequisite, E.E. 54.

198. TELEVISION ENGINEERING.—The application of Electronics and Radio Engineering to the special problems of Television. Among the topics considered are the fundamentals of scanning and bandwidth selection; noise limitations associated with primary and secondary emission; iconoscope, image orthocon, image-dissector and other types of pickup tubes; kinescopes; television transmitters, receivers and antennas.

Credit, 4.

3 class hours; one 3-hour laboratory period.

Mr. LANGFORD and Mr. MOHN.

Prerequisites, E.E. 56 and 183.

English

FRANK P. RAND, major adviser.

Language requirement: the ability to translate, with the aid of a dictionary, two languages other than English.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. OLD ENGLISH.—A study of Old English grammar with prose translation. This (or 203.) required of all English majors. Given in alternate years, beginning 1952-53.

Credit, 3.

Mr. LANE.

203. MIDDLE ENGLISH.—A study of the language of Chaucer and the mediaeval romances. This (or 201.) required of all English majors. Given in alternate years, beginning 1953-54.

Credit, 3.

Mr. HELMING.

251. SHAKESPEARE.—A close study of *Henry 4—Part 1*, *Twelfth Night*, *King Lear*, and *Cymbeline*. Given in alternate years, beginning 1953-54.

Prerequisite, English 155.

Credit, 3.

Mr. TROY.

254. CARLYLE.—A comprehensive and intensive study of the life and writings of Thomas Carlyle. Relevant biographic, textual, ideational, and esthetic problems will be explored so as to acquaint the student with pertinent scholarly methods and materials, and to develop his competence in research and criticism. Given in alternate years, beginning 1953-54.

Credit, 3.

Prerequisite, English 165.

Mr. GOLDBERG.

261. MELVILLE.—An exploration of the life, thought and art of the most complex and representative figure of the American Renaissance. Although emphasis will be placed upon the pre-Civil War novels, the later poetry will also be examined. Given in alternate years, beginning 1952-53.

Credit, 3.

Prerequisite, English 167.

Mr. KAPLAN.

264. JOYCE, YEATS, AND ELIOT.—An intensive study of the experiments in expressing personal experience, that established the Twentieth Century literary myths. Given in alternate years, beginning 1952-53.

Credit, 3.

Prerequisite, English 176.

Mr. VARLEY.

300. THESIS, MASTER'S DEGREE.

Credit, 6-10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

In these courses English majors are required to supplement the undergraduate assignments with a substantial special study.

150. CHAUCER.

Credit, 3

Mr. HELMING.

151. THE RENAISSANCE IN ENGLAND.

Credit, 3

Mr. TROY.

153. LYRICAL POETRY OF THE RENAISSANCE IN ENGLAND.—Given in alternate years, beginning 1952-53.

Credit, 3.

Mr. GOLDBERG.

154. MILTON.

Credit, 3.

Mr. GOLDBERG and Mr. HELMING.

155. SHAKESPEARE. Credit, 3.
Mr. RAND.
158. OTHER ELIZABETHAN DRAMATISTS. Credit, 3.
Mr. O'DONNELL.
159. THE AGE OF POPE. Credit, 3.
Mr. TROY.
160. THE AGE OF JOHNSON. Credit, 3.
Mr. TROY.
161. THE LAKE POETS.—Given in alternate years, beginning 1952-53.
Credit, 3.
Mr. RAND.
162. BYRON, SHELLEY, AND KEATS.—Given in alternate years, beginning 1952-53.
Credit, 3.
Miss HERRIGAN.
163. AMERICAN POETRY (1700-1900). Credit, 3.
Mr. WILLIAMS and Mr. O'DONNELL.
165. PROSE OF THE ROMANTIC MOVEMENT. Credit, 3.
Mr. GOLDBERG.
166. VICTORIAN PROSE. Credit, 3.
Mr. GOLDBERG.
167. AMERICAN PROSE. Credit, 3.
Mr. O'DONNELL.
169. VICTORIAN POETRY.—Given in alternate years, beginning 1951-52.
Credit 3.
Mr. RAND.
173. ENGLISH PROSE FICTION. Credit, 3.
Mr. HELMING.
174. GREEK CLASSICS IN TRANSLATION. Credit, 3.
Mr. HELMING and Mr. TROY.
179. LITERARY CRITICISM FROM ARISTOTLE TO 1800.—Given in alternate years, beginning 1953-54.
Credit, 3.
Mr. GOLDBERG.
180. LITERARY CRITICISM SINCE 1800.—Given in alternate years, beginning 1953-54.
Credit, 3.
Mr. GOLDBERG.

COURSES FOR MINOR CREDIT ONLY

168. MODERN DRAMA. Credit, 3.
Mr. RAND and Mr. WILLIAMS.
171. BIOGRAPHY. Credit, 3.
Mr. HELMING.
172. THE BIBLE AS LITERATURE. Credit, 3.
Mr. RAND.
176. MODERN POETRY. Credit, 3.
Miss HERRIGAN and Mr. RAND.
177. THE MODERN NOVEL. Credit, 3.
Mr. VARLEY.

Entomology

CHARLES P. ALEXANDER, major adviser

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

(Most courses in the department are given on a 3-year cycle, subject to change on student demand.)

201, 202. **ADVANCED INSECT MORPHOLOGY AND PHYLOGENY.**—Laboratory, lecture, and reading assignments in morphology and phylogeny of all orders of insects, living and fossil. Credit, 3 each semester

Prerequisites, Entomology 26, 155, 156, 157 or equivalent. Mr. HANSON.

203. **INSECT EMBRYOLOGY.**—The embryological development of a generalized type of insect, after which specific insects are considered. Lectures, assigned readings, laboratory work. Credit, 2.

Prerequisite, ENTOMOLOGY 157. Mr. SHAW.

204. **INSECT HISTOLOGY.**—Types of tissues and organs of insects. Laboratory work, discussion and assigned readings. Credit, 2.

Prerequisites, Entomology 157; Zoology 50. Mr. SHAW.

207. **ADVANCED INSECT PHYSIOLOGY.**—Discussion and laboratory work dealing with the functions of the organ systems of insects. Emphasis is placed on methods of analysis and study of physiological processes in insects. Credit, 3.

Prerequisite, Entomology 181 or equivalent. Mr. SWEETMAN.

210. **INSECT INTERRELATIONSHIPS.**—A systematic survey of the various ways in which insects live with, make use of, or are utilized by living organisms, including intra-specific relations; the aim is to present an integrated picture of relationships among insects, and between insects and the living world. Lectures, readings, papers. Credit, 2.

Prerequisites, Entomology 26 and 179. Miss SMITH.

211. **INSECT BEHAVIOR.**—The honey bee is selected as a type for the study of behavior. Lectures; laboratory work to attempt to interpret the reasons for the actions of this insect. Other species may be included for completeness.

Prerequisites, Entomology 26, 166 or equivalent. Credit, 3.
Mr. SHAW.

212. **GEOGRAPHICAL DISTRIBUTION OF ANIMALS AND PLANTS.**—The entire field of distribution of life is considered, including a discussion of physical geography, climate, and other materials basic to the subject. Credit, 3.

2 credits 1st semester, 1 credit 2nd semester.
Prerequisites, Botany 1; Zoology 1. Mr. ALEXANDER.

214. **ADVANCED ANIMAL ECOLOGY.**—Basic principles of terrestrial, limnological, and marine ecology. Special emphasis is placed on the influence of causal factors, both physical and biotic, that regulate the activities of all organisms.

Prerequisite, Entomology 179, or equivalent. Credit, 3.
Mr. SWEETMAN.

221. **ADVANCED CHEMICAL CONTROL OF INSECTS.**—The chemistry of insecticides and their physiological effects on insects, man and other animals. Credit, 3.

Mr. SWEETMAN.
Prerequisites, Entomology 180 and Pomology 156, or equivalent.

223. **ADVANCED BIOLOGICAL CONTROL.**—The basic fundamental principles, as well as practical application of biological control of insects. A section is devoted to control of pest weeds with insects. Credit, 3.

Prerequisite, Entomology 180, or equivalent. Mr. SWEETMAN.

224. **LEGISLATIVE CONTROL OF INSECTS AND INSECTICIDES.**—The legal aspects of prevention, control, and eradication of pests; insecticide laws, and health laws regarding use of insecticides. Emphasis is placed on the importance of basic knowledge of the biology and habits of insects and other pest organisms as related to legal and other methods of control and eradication. Credit, 3.

Mr. SWEETMAN.

230. **ADVANCED APICULTURE.**—This course is designed to provide necessary background for whatever phase of beekeeping the student desires, equipment permitting. Among such topics available are management, biometry, bee poisoning, pollination. Credit, 2-5.

Prerequisites, Entomology 166, 185, or equivalent.

Mr. SHAW.

240. **COCCIDIOLOGY.**—Lecture and laboratory work on scale insects; their relationships, structure, habits, technique of mounting, identification, damage, and control. Credit, 2.

Prerequisite, Entomology 26, or equivalent.

Mr. HANSON.

241. **CLASSIFICATION OF MINOR ORDERS OF INSECTS.**—Laboratory work in taxonomy of the many groups with relatively few species. Credit, 2.

Prerequisites, Entomology 26, 155, 156, 157, or equivalent.

Mr. HANSON.

242. **ADVANCED ARTHROPOD TAXONOMY.**—Classification of various groups of insects and insect allies, indicating the latest methods in taxonomy and the principles of classification. In addition to groups listed below, work may be offered in such groups as Ephemera, Plecoptera, Diptera (esp. Tipulidae and Mycetophilidae), Lepidoptera, and others upon special arrangement in advance. Credit, 1-9.

THE STAFF.

A. Culicidae	Miss SMITH
B. Immature stages of insects	Miss SMITH
C. Ticks	Mr. SHAW
D. Siphonaptera	Mr. SHAW
E. Simuliidae	Mr. SHAW
F. Tabanidae	Mr. SHAW

245. **HISTORICAL ENTOMOLOGY.**—Lives and works of outstanding entomologists of the world; history of entomology; and classification of insects.

Credit, 3.

(2 credits 1st semester;

1 credit 2nd semester)

Prerequisites, Entomology 26, 153.

Mr. ALEXANDER.

248. **PRINCIPLES OF SYSTEMATIC ENTOMOLOGY.**—Particular stress is placed on a consideration of the International Code of Zoological Nomenclature, and the Opinions thereon; type categories; the species concept; major insect collections; leading entomological specialists. Credit, 3.

(2 credits 1st semester;

1 credit 2nd semester)

Prerequisites, Entomology 26, 155, 156.

Mr. ALEXANDER.

250. **ADVANCED MEDICAL ENTOMOLOGY.**—This course is designed to provide training in whatever phase of medical entomology a student selects (materials and references permitting). Such work might include systematic studies of a family or order of insects involved in medical entomology, the biology of any particular group of insects, control measures. Credit, 2-5.

Prerequisites, Entomology 174 or its equivalent.

Mr. SHAW.

270. **ADVANCED RESEARCH METHODS.**—The principles, methods of analysis, and presentation of results of research. A section is devoted to statistical treatment and analysis of research. Credit, 3.

Mr. SWEETMAN.

Prerequisites, Research portion of Entomology 181, or equivalent.

280. **SEMINAR.**—Reports on the current literature of entomology; special reports by resident and visiting speakers. Credit, 1 per year

One class hour.

(Maximum for M.S. Candidates, 2)

(Maximum for Ph.D. Candidates, 4)

300. **THESIS, MASTER'S DEGREE.**—Original work on one or more topics in insect morphology, systematic entomology, medical entomology, insect physiology, insecticides, biological control or apiculture. The thesis requires from one-half to two-thirds of the total working time of the student in his major field. Credit, 10.

400. **THESIS, PH. D. DEGREE.**—Original work on one or more topics in insect morphology, systematic entomology, medical entomology, insect physiology, insecticides, biological control or apiculture. The thesis requires from one-half to two-thirds of the total working time of the student in his major field.

Credit, 30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

185. **ADVANCED BEEKEEPING.**—A course designed to present more complete knowledge of the more important problems of beekeeping, including management, processing honey and wax, bee diseases, and improvement of honeybees.

Credit, 3.

Prerequisite, Entomology 166.

Mr. SHAW.

187, 188. **SPECIAL PROBLEMS IN ENTOMOLOGY.**—Problem work in many fields, as apiculture, biological control and insectary practice, insecticides, morphology, and classification.

Credit, 1, 2, or 3.

THE STAFF.

189. **ENTOMOLOGICAL TECHNIQUES.**—Techniques in the mounting and preservation of insects for study and display by means of fluids, slides, plastics, pinning, and other methods.

Credit, 2.

Prerequisite, Entomology 26.

Miss SMITH.

Prerequisites, Entomology 26, 53, 155, 157, and should be preceded or accompanied by other courses in the restricted field of the problem.

190. **EVOLUTION.**—A course in orientation. Lectures consider evolution of both organic and inorganic matter with attention to the evolution of human behavior and to the effect of evolutionary concepts on human philosophy. Extra supplementary reading required of graduate students.

Credit, 2-3.

Mr. HANSON.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Botany 184. **INSECT TRANSMISSION OF PLANT DISEASES.** Credit, 2.

Mr. BANFIELD.

Zoology 174. **LIMNOLOGY.** Credit, 4.

Miss TRAVER and STAFF.

Zoology 185. **CLASSES OF ARTHROPODS OTHER THAN INSECTS.** Credit, 3

Mr. HANSON.

COURSES FOR MINOR CREDIT ONLY

151. PESTS OF SPECIAL CROPS.	Credit, 3. Mr. SHAW.
155, 156. CLASSIFICATION OF INSECTS.	Credit, 3. Mr. ALEXANDER, Miss SMITH.
157. INSECT MORPHOLOGY.	Credit, 4. Mr. HANSON.
166. INTRODUCTORY BEEKEEPING.	Credit, 3. Mr. SHAW.
172. FOREST AND SHADE-TREE INSECTS.	Credit, 3. Mr. HANSON.
174. MEDICAL ENTOMOLOGY.	Credit, 3. Mr. SHAW.
179. ANIMAL ECOLOGY.	Credit, 3. Mr. SWEETMAN.
180. INSECT CONTROL.	Credit, 3. Mr. SWEETMAN.
181. PHYSIOLOGICAL ENTOMOLOGY.	Credit, 3. Mr. SWEETMAN.

Floriculture

CLARK L. THAYER, major adviser.

All students who major in this department are required to present a thesis as a part of the major requirements.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

Horticulture 211, 212. SEMINAR.—Each student will present reviews of assigned papers on topics in Horticulture. Departments of Floriculture, Olericulture and Pomology cooperating. Required of all graduate students majoring in Floriculture, Olericulture and Pomology.

Credit, 1 each semester.

THE DEPARTMENTS.

226. GARDEN MATERIALS.—Technical studies of a specific genus of plants or a group of plants used in gardening.

Credit, 3.

Prerequisite, Floriculture 26.

Mr. DUNHAM.

275. ADVANCED COMMERCIAL FLORICULTURE.—Problems dealing with the methods of production of cutflowers and plants under glass. Opportunity is given for a study of factors concerned with methods of marketing such products.

Credit, 3.

Mr. HUBBARD.

279. CONSERVATORY PLANTS.—Investigations dealing with plant materials which are used primarily in conservatories or in gardens in warm climates.

Prerequisite, Floriculture 179.

Credit, 3.

Mr. THAYER.

290. HISTORY OF FLORICULTURE AND FLORICULTURAL LITERATURE.—Consideration of men who have influenced the development of floriculture. Events that have given impetus to the industry. Survey of floricultural literature. Required of all graduate students in the department.
Credit, 3.

Mr. THAYER.

297, 298. SEMINAR.—A review of scientific literature in the field of floriculture or in related fields.
Credit, 1 each semester.

Mr. WHITE and THE STAFF.

300. THESIS, MASTER'S DEGREE.—For students having a major in Floriculture. Based on an original investigation of a problem selected by agreement between the student and the staff.
Credit, 10.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 263. CHEMISTRY OF THE SOIL. Credit, 3 each semester
Mr. STECKEL.

Agronomy 264. EXPERIMENTAL METHODS IN AGRONOMY. Credit, 3.
Mr. YEGIAN.

Botany 161, 162. THE COMPARATIVE ANATOMY OF GREEN PLANTS.
Credit, 3 each semester.
Mr. TORREY.

Botany 158. MICROTECHNIQUE. Credit, 2.
Mr. TORREY.

Botany 159, 160. THE ANGIOSPERMS. Credit, 2-3 each semester.
Mr. TORREY.

Olericulture 201. LITERATURE. Credit, 3.
Mr. LACHMAN.

Plant Breeding 152. ADVANCED PLANT BREEDING. Credit, 3.
Mr. FRENCH.

Plant Breeding 181. PLANT CYTOLOGICAL TECHNIQUE. Credit, 2.
Mr. FRENCH.

Plant Breeding 182. SPECIAL PROBLEMS. Credit, 2.
Mr. FRENCH.

COURSES FOR MINOR CREDIT ONLY

151. GREENHOUSE MANAGEMENT. Credit, 3.
Mr. THAYER and Mr. DUNHAM.

152. FLORAL ARRANGEMENT. Credit, 3
Mr. THAYER and Mr. ROSS.

175, 176. COMMERCIAL FLORICULTURE. Credit, 3 each semester.
Mr. HUBBARD.

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| 179. CONSERVATORY PLANTS. | Credit, 2
Mr. THAYER and Mr. DUNHAM |
| 181. HERBACEOUS GARDENS AND BORDERS. | Credit, 3
Mr. HUBBARD. |
| 182. SEMINAR (Problem course). | Credit, 3
Mr. THAYER. |

Food Sciences

This is a cooperative major designed for Ph.D. candidates who wish to prepare for research in various phases of the food sciences. It is designed to give a broader and somewhat less intensive scientific base for research or its application in industry than is possible when a student takes most of his major work in one department only. This plan provides for a candidate to place the major emphasis in one of the five departments cooperating which may or may not offer a Ph.D. degree in the department.

The departments cooperating are Bacteriology, Chemistry, Dairy Industry, Food Technology, and the School of Home Economics (Foods and Nutrition). Courses, if properly selected, will satisfy both major and minor requirements. The proportionate contribution of each department will depend upon the student's special interests within the field but a minimum of six credits must be earned in each of the departments contributing to this major.

Candidates for the Ph.D. degree in the Food Sciences are assigned to an advisory committee composed of the heads of the five departments concerned, with the head of the department in which the thesis research is planned serving as chairman. This advisory committee will direct the student's progress, conduct the preliminary examination, and approve the thesis subject. The thesis committee, appointed by the Scholarship Committee of the Graduate School Council with the staff member who is directing the thesis serving as chairman, will have direct charge of all matters pertaining to the thesis investigation.

The 30 major course credits required for the Ph.D. must be distributed among at least 3 of the 5 departments concerned. The minimum requirement of six credits in other departments may be satisfied by either major or minor credits. Courses offered by the 5 departments which are acceptable for major credit toward the degree in Food Sciences have been designated by the advisory committee as follows:

- | | |
|--------------------|-------------|
| 400. THESIS, PH.D. | Credit, 30. |
|--------------------|-------------|

Bacteriology

- 202. BACTERIAL PHYSIOLOGY.
- 203. BACTERIAL CYTOLOGY.
- 204. ADVANCED STUDIES OF SPECIAL BACTERIAL GROUPS
- 205. ADVANCED IMMUNOLOGY.
- 206. INDUSTRIAL BACTERIOLOGY.
- 207. VIROLOGY.
- 208. SEMINAR.
- 182. FOOD BACTERIOLOGY.
- 185. IMMUNOLOGY.
- 190. SANITARY BACTERIOLOGY.

Chemistry

- 237. BIOPOLYMER.
- 239. CHEMISTRY OF NATURAL PRODUCTS.
- 165, 166. PHYSICAL CHEMISTRY. (For minor credit only)
- 179. BIOCHEMISTRY. (For minor credit only)
- 183. ADVANCED QUANTITATIVE ANALYSIS.
- 193, 194. GENERAL BIOCHEMISTRY

Dairy Industry

- 175. DAIRY CHEMISTRY.
- 201. PROBLEMS IN DAIRY TECHNOLOGY.
- 202. ADVANCED DAIRY CHEMISTRY.
- 209, 210. SEMINAR.

Food Technology

- 201, 202. SPECIAL INVESTIGATIONS.
- 209, 210. THERMAL PROCESSING OF FOODS.
- 216. FOOD PACKAGING.
- 221. EDIBLE FATS AND OILS.
- 241. FOOD ACCEPTANCE—THEORY AND METHODOLOGY.
- 271, 272. SEMINAR REVIEW OF CURRENT LITERATURE AND RESEARCH.
- 285, 286. FISHERIES TECHNOLOGY.
- 161, 162. INDUSTRIAL PRACTICES.
- 191, 192. FOOD ANALYSIS.

Foods & Nutrition

- 203. ADVANCE NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.
- 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.
- 205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION.
- 207. PROBLEMS IN NUTRITION.
- 211, 212. NUTRITION SEMINAR.
- 189. DIET THERAPY.

Food Technology

CARL R. FELLERS, major adviser.

Graduate students who wish to major in Food Technology may not be admitted to candidacy for an advanced degree until such time as the undergraduate requirements in basic sciences and Food Technology have been substantially met.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. RESEARCH PROBLEM.—This course is mainly for candidates for the Master of Science degree. Original research is expected. Two bound copies (flexible binding permissible) are required by the Department.

Credit, 3-6.

THE STAFF.

201, 202. SPECIAL INVESTIGATIONS.—A series of individual problems and assignments covering plant layouts, process development, quality control and economics of production. Laboratory, pilot plant and library exercises.

Credit, 1-3 each semester.

THE STAFF.

Two bound copies (flexible binding permissible) are required by the Department.

209, 210. **THERMAL PROCESSING OF FOODS.**—Biological and Physical Aspects. A study of the factors affecting heat transfer in canned goods. Heating characteristics of canned foods packed in tin, glass, and other containers. Determination of thermal death points of spoilage micro-organisms. Derivation of processing times and temperatures. Causes of spoilage and container failure. Principles of retort operation and control; instrumentation.

First semester—2 lectures or conferences.

Credit, 2.

Second semester—1 lecture, one 4-hour laboratory.

Credit, 3.

Prerequisites, Food Tech. 162 and Bact. 182.

Mr. ESSELEN.

212. **FREEZING AND REFRIGERATION.**—Lay-out of cold storage plants. Practical refrigeration systems. Equipment and methods used in quick-freezing fruits, vegetables, meats, and marine products. Packaging and quality control. Home freezers and commercial frozen-food lockers. Laboratory and class work.

Prerequisites, Food Tech. 152, Ag. Engin. 180 or 182.

Credit, 2-4.

Mr. FELLERS.

216. **FOOD PACKAGING.**—A study of the characteristics of all packaging materials including flexible films and how they meet the package requirements of various food products. Methods of testing for structural quality and performance, moisture and gas transmission, and other properties. Consideration of adhesives, lacquers and closures included. Occasional lectures by qualified representatives of industry. Plant visits in non-scheduled hours.

One 4-hour laboratory period; one or more class or discussion hours.

Credit, 3.

Prerequisite, Food Tech. 162.

Mr. LEVINE.

221. **EDIBLE FATS AND OILS.**—The production and uses of edible fats and oils and their chemical nature in relationship to stability. The problem of oxidation and rancidity is considered with emphasis on cause of deterioration and methods of stabilization.

Credit, 2.

One class hour, one 2-hour laboratory period.

Mr. ANDERSON.

232. **UNIT PROCESSES.**—Unit processes pertaining to the food industries are covered. The work includes instrumentation, temperature measurement, blanching, filtration, comminution, deaeration and extraction, processing, cooling, heat transfer, fluid flow, distillation, dehydration, and evaporation.

Credit, 2.

Mr. FAGERSON.

Prerequisites, Food Tech. 162 and Ag. Engin. 180.

241. **FOOD ACCEPTANCE—THEORY AND METHODOLOGY.**—A critical analysis of objective and subjective methods of evaluation of the quality of processed foods. Physical and chemical means of expressing quality of a product. Sensory methods including difference-preference tests, panel tests, threshold tests, etc. Application of statistical methods including control chart techniques. Psychological and physiological factors affecting flavor appraisal.

1 lecture; 1 conference.

Prerequisites, Food Technology 192, 162.

Credit, 2.

Mr. FAGERSON.

271, 272. **SEMINAR.**—Review of current literature and research.

Credit, 1-2 each semester.

THE STAFF.

285, 286. **FISHERIES TECHNOLOGY.**—Marine products of commerce. Processed seafoods. Canning, curing, freezing and refrigeration. Spoilage problems. By-products. Chemical and microbiological aspects. Scientific literature. Industrial problems.

Credit, 2-3 each semester.

One class hour plus laboratory work to be arranged.

Mr. FELLERS.

295. BIOLOGICAL ASSAY OF FOODS.—Provides laboratory training and practice in making animal and microbiological assays of food constituents important in human and animal nutrition. Credit, 2-5.

Prerequisites, Chem, 179 and Food Tech. 192.

Mr. PARKINSON.

300. THESIS, MASTER'S DEGREE.—Research on some suitable problem in Food Technology. Facilities for nutrition research are provided by well-equipped chemical, physical, and small-animal laboratories and poultry plant. Credit, 10.

400. THESIS, PH. D. DEGREE.—Research on some suitable problem in Food Technology. Facilities for nutrition research are provided by well-equipped chemical, physical, and small-animal laboratories and poultry plant. Credit, 30.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

161, 162. INDUSTRIAL PRACTICES.—Advanced laboratory and pilot plant work in the production of canned, frozen and dehydrated fruits, vegetables, meat, and fish products. The theory and practice in manufacturing jams, jellies and condiments as well as fermented, salted and smoked foods; cereal products and soups. Credit, 3 each semester.

One class hour, one 4-hour laboratory period.

Mr. LEVINE.

182. CONFECTIONS AND CEREAL PRODUCTS.—Candy making, maple products, sugar and fountain syrups, corn products such as starch, syrups, dextrose and their uses. Candied fruits and preserves. Flavoring essences, spices, carbonated beverages. This course also considers the principles of baking, doughs, and various prepared cereals and dry mixes. Credit, 3.

One class hour, one 4-hour laboratory period.

Mr. LEVINE.

191, 192. ANALYSIS OF FOOD PRODUCTS.—Factory and laboratory methods. Grades and quality factors; physical, chemical, microbiological and microscopical methods, and interpretation of results. Government and trade standards; Federal and State food regulations; mold and insect counts; plant control procedures will be stressed. Food preservatives and flavorings. Credit, 3 each semester.

Mr. FELLERS and Mr. NEBESKY.

(The second semester is a continuation of 191 with emphasis on the public health aspects of food analysis and quality control; plant sanitation.)

One 4-hour laboratory period, one lecture.

Prerequisites, Chem. 30, Food Tech. 152 or 175.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Dairy Industry 152. MARKET MILK.

Credit, 4.

Mr. LINDQUIST.

Dairy Industry 177. BUTTER AND CHEESE.

Credit, 4.

Mr. LINDQUIST, Mr. NELSON and Mr. FINNEGAN

Dairy Industry 178. ICE CREAM MAKING.

Credit, 4

Mr. NELSON.

Animal Husbandry 154. MEAT PROCESSING.

Credit, 2

Mr. TIMBERLAKE.

BACTERIOLOGY 206. INDUSTRIAL BACTERIOLOGY.	Credit, 3. Mr. CZARNECKI.
Home Economics 205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION.	Credit, 3. Mrs. WERTZ.
Olericulture 173. VEGETABLE MARKETING PRACTICES.	Credit, 3 Mr. SNYDER
Olericulture 174. MERCHANDIZING OF PERISHABLES.	Credit, 3. Mr. SNYDER.

COURSES FOR MINOR CREDIT ONLY

151. FRUIT AND VEGETABLE PRODUCTS.—This is a general elementary course covering food economics, production, distribution and processing. The applications of fundamental science to the food industries are pointed out. The laboratory exercises cover both the theory and practice of canning, freezing, and dehydration. The principles of packaging are considered. Fruit and vegetable products are prepared and graded. Credit, 3.

One class hour, one 4-hour laboratory period.

Mr. FELLERS.

152. FOOD PRODUCTS AND ADJUNCTS.—This is a continuation of 151. The laboratory work includes pickles and pickle products, maple products, citrus products, fruit syrups, soups, condiments and the preservation of meats, poultry and vegetables. The properties and uses of sugars, syrups, salt, enzymes, pectin, chemical preservatives and anti-oxidants, are considered. Practice is given in the use and handling of instruments and equipment. Credit, 3.

Two class hours, one 2-hour laboratory period.

Mr. FELLERS.

175, 176. FOOD PRESERVATION.—This is a general course in food preservation and is intended only for those who desire a survey of the field in a condensed form. Not open to Food Technology majors. Credit 3, either semester.

One class hour, two 2-hour laboratory periods.

Mr. NEBESKY.

195, 196. INTRODUCTORY RESEARCH METHODS.—The application of the fundamental sciences to food technology research. Library and laboratory research on assigned individual problems. Credit, 2 each semester.

By arrangement.

Mr. FELLERS, Mr. LEVINE.

Forestry

COURSES FOR MINOR CREDIT ONLY.

151. FOREST MANAGEMENT OF WATERSHEDS.—A study of forest site and water factor relationships; the measurability of the forest resources and their management toward realizing the multiple values of watersheds. The protection of forested watersheds. Credit, 3.

Mr. RHODES, Mr. STICKEL and Mr. HOLDSWORTH.

153. SILVICS.—Forest ecology as the basis for silvacultural practice.

Credit, 3.

Mr. RHODES.

154. FOREST SOILS.—A study of the soils of forests as they influence forest growth and management and as they are influenced by forest trees and forest management. Credit, 3.

Mr. RHODES.

155. **ELEMENTS OF FOREST MENSURATION.**—Methods of inventorying the volumes of the timber capital or growing stock and other resources of the forest, including growth rates and increase in wood volume. Credit, 3.

Mr. MACCONNELL and Mr. GANLEY.

156. **PRINCIPLES OF APPLIED SILVICULTURE.**—Forest establishment and cultural development through silvicultural practice. Credit, 3.

Mr. RHODES and Mr. HOLDSWORTH.

157. **ECONOMICS OF FORESTRY.**—The resource values of the forest with the history of their economic development. Credit, 3.

Mr. HOLDSWORTH.

159. **FOREST PROTECTION.**—The principle of protecting forests from all harmful agencies. Credit, 3.

Mr. STICKEL.

176. **WOOD TECHNOLOGY.**—A comprehensive survey of the structure, composition and properties of wood in relation to wood utilization. Credit, 3.

Mr. RICH.

185. **SEASONING OF WOOD.**—Methods of air seasoning and kiln drying lumber. Credit, 3.

Mr. RICH.

Geology and Mineralogy

LEONARD R. WILSON, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY.

(For either major or minor credit)

200. **SPECIAL PROBLEMS.**—For students desiring to pursue special work not covered by courses listed in the curriculum. Permission to take one or both courses must be secured from the head of the department and the instructor under whom the study will be done. The latter will outline and supervise the work. Credit, 6.

THE STAFF.

201. **OPTICAL MINERALOGY.**—An introduction to the theory, procedure and technique involved in the study of minerals by means of the petrographic microscope. The laboratory work will include the preparation of thin sections of minerals and rocks, together with a study of their optical properties by means of polarized light. Credit, 3.

Given in alternate years, beginning 1952-53.

Mr. NELSON.

Prerequisite, Geology 151.

212. **SEDIMENTATION.**—A course dealing with the sources, deposition, modifying conditions, structures and environmental relationships of sediments and their consolidated equivalents. Given in alternate years, beginning 1952-53.

Credit, 3.

Mr. LIGHT.

221. **ANIMAL MICROPALAEONTOLOGY.**—Principles of animal micropalaeontology with emphasis on the use of animal microfossils in stratigraphic investigations. Credit, 3.

Mr. WILSON and Mr. JOHANSSON.

222. PLANT MICROPALAEONTOLOGY.—Principles of plant micropaleontology with emphasis on the use of plant microfossils in stratigraphic investigations.

Credit, 3.

Mr. WILSON.

241. SEMINAR.—Review of current literature or discussion of selected topics.

Credit, 1 each semester. Maximum credit, 2.

THE STAFF.

300. THESIS, MASTER'S DEGREE.—Research on an approved problem.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

173. STRUCTURAL GEOLOGY.—A study of the origin of rock structures, their occurrence and recognition. Undergraduates must have the permission of the instructor before enrolling.

Credit, 3.

Mr. LIGHT.

174. PRINCIPLES OF STRATIGRAPHY.—A study of the principles of stratigraphic correlation as related to the major rock units of the United States. Undergraduates must have the permission of the instructor before enrolling.

Credit, 3.

Mr. WILSON.

COURSES FOR MINOR CREDIT ONLY

151. MINERALOGY.—A descriptive study. Stress is placed upon the identification and occurrence of minerals.

Credit, 3.

One class hour; two 2-hour laboratory periods.

Mr. NELSON.

152.—PETROLOGY.—A descriptive study of the classes of rocks with reference to manner of origin, modes of occurrence, structural features and the chemical and petrographic distinction within each group.

Credit, 3.

One class hour; two 2-hour laboratory periods.

Mr. NELSON.

161. GEOMORPHOLOGY.—A review of recent studies concerning rock structures, weathering, underground water, streams, alpine and continental glaciers, shorelines, and wind work. Given in alternate years, beginning 1952-53.

Credit, 3.

Two class hours; one 2-hour laboratory period.

Mr. WILSON.

162. GEOMORPHOLOGY.—A review of recent studies concerning the physical geological role of organisms, coastal plains, plains and plateaus, volcanoes, dome, block, folded and complex mountains. Given in alternate years, beginning 1952-53.

Credit, 3.

Two class hours; one 2-hour laboratory period.

Mr. WILSON.

163. INVERTEBRATE PALEONTOLOGY.—A study of the history, development and identification of invertebrate animal fossils. Field trips by arrangement.

One class hour; two 2-hour laboratory periods.

Credit, 3.

Mr. JOHANSSON.

164. PLANT PALEONTOLOGY.—A study of the history, development and identification of plant fossils. Field trips by arrangement.

Credit, 3.

One class hour; two 2-hour laboratory periods.

Mr. WILSON.

German

COURSES FOR MINOR CREDIT ONLY

- 151, 152. NINETEENTH CENTURY.—German Literature for Heine to Hauptmann.
Credit, 3.
Mr. ELLERT.
- 155, 156. German literature from "Sturm and Drang" to "Romantik," beginning with the early plays of Goethe and Schiller. The Romantic period from Novalis to Heine.
Credit, 3.
Mr. ELLERT.
- 157, 158. GOETHE'S FAUST.
Credit, 3.
Mr. GOLDSMITH.
- 159, 160. GERMAN CLASSICISM (1750-1832), with special emphasis on Goethe.
Credit, 3.
Mr. GOLDSMITH.

Government

COURSES FOR MINOR CREDIT ONLY

152. EUROPEAN GOVERNMENT.—A comparative study of politics and government in European countries with special attention to problems of modern democracy and dictatorship.
Credit, 3.
Mr. MATTHEWS.
162. ADMINISTRATIVE LAW.
Credit, 3.
Mr. GOODWIN.
163. POLITICAL PARTIES AND ELECTIONS.
Credit, 3.
Mr. GOODWIN.
164. MUNICIPAL GOVERNMENT.
Credit, 3.
Mr. GOODWIN.
165. CONSTITUTIONAL LAW.
Credit, 3.
Mr. GOODWIN.
166. AMERICAN POLITICAL THOUGHT.
Credit, 3.
Mr. _____
167. INTERNATIONAL GOVERNMENT.—A study of international organization in the twentieth century, with emphasis upon the United Nations and regional organizations.
Credit, 3.
Mr. ALLEN
168. INTERNATIONAL LAW.—A study of the scope and significance of international law in contemporary international relations.
Credit, 3.
Mr. _____
171. ANCIENT AND MEDIEVAL POLITICAL THOUGHT.
Credit, 3.
Mr. _____
172. MODERN POLITICAL THOUGHT.
Credit, 3.
Mr. _____
- 193, 194.—SEMINAR.—A study of special problems in the field of government.
Credit, 3 each semester.
THE STAFF.

History

THEODORE C. CALDWELL, major adviser.

In addition to the general requirements for the Master of Arts degree, candidates in History must fulfill the following departmental requirements:

All candidates are required to take the *Graduate Record Examination*. If possible, this should be taken before admission to the Graduate School; otherwise, it must be taken as soon as possible after admission.

A reading knowledge of one foreign language is required.

The requirement concerning a thesis may be fulfilled by one of the following options: (a) completion of a thesis, for ten credits, (b) completion of two seminar courses, with grades of at least 80, (c) completion of a five credit thesis and one seminar.

A comprehensive written examination, in fields specified by the Department, is required of all candidates.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. SOCIAL AND INTELLECTUAL HISTORY OF THE UNITED STATES.—1815-1896.—An analysis of developments in the principal sections of the U. S. Credit, 3.
Prerequisites, 159 and 160. Mr. DAVIS.

210. THE PROGRESSIVE MOVEMENT AND THE NEW DEAL IN THE UNITED STATES, 1896-1940.—Conditions and ideas in the revolt against conservatism. Credit, 3.
Prerequisites, History 159 and 160. Mr. CARY.

251. SEMINAR IN AMERICAN DIPLOMATIC HISTORY.—Training in historical research. Credit, 3.
Admission by consent of instructor. Mr. CARY.

256. SEMINAR IN THE WESTWARD MOVEMENT OF THE UNITED STATES.—Training in historical research. Credit, 3.
Admission by consent of instructor. Mr. DAVIS.

300. THESIS, MASTER'S DEGREE. Credits, 5 or 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

The following courses are open to both graduate and undergraduate students who have fulfilled the prerequisites including History 5 or 6 or their equivalent. Graduate students will be expected to do such additional work as shall be prescribed by the instructor.

151. ANCIENT HISTORY. Credit, 3.
Mr. DAVIS.

153. INTERNATIONAL RELATIONS. Credit, 3.
Mr. PFLANZE.

154. THE FAR EAST IN MODERN TIMES.—Given in alternate years, beginning 1952-53. Credit, 3.
Mr. GAGNON.

156. THE HISTORY OF MODERN RUSSIA.—Given in alternate years, beginning 1951-52. Credit, 3.
Mr. GAGNON.
- 157 and 158. HISPANIC-AMERICAN HISTORY. Credit, 3 each semester.
Mr. POTASH.
165. NINETEENTH AND TWENTIETH CENTURY ENGLAND. Given in alternate years, beginning 1951-52. Credit, 3.
Prerequisite, History 32 or permission of instructor. Mr. CALDWELL.
167. TUDOR AND STUART ENGLAND. Given in alternate years, beginning 1952-53. Credit, 3.
Prerequisite, History 31 or permission of instructor. Mr. CALDWELL.
169. EUROPE, 1870-1918. Credit, 3.
Mr. ZEENDER.
170. EUROPE, SINCE 1918. Credit, 3.
Mr. CALDWELL.
172. HISTORY OF AMERICAN WESTWARD EXPANSION, 1763-1893. Credit, 3.
Prerequisite, History 159 or permission of instructor. Mr. DAVIS
175. MEDIEVAL EUROPE. Credit, 3.
Mr. ZEENDER.
176. HISTORY OF THE RENAISSANCE. Credit, 3.
Mr. ZEENDER.
181. DIPLOMATIC HISTORY OF THE UNITED STATES, 1776-1900. Credit, 3.
Prerequisites, History 159 and 160 or permission of instructor. Mr. CARY.
182. DIPLOMATIC HISTORY OF THE UNITED STATES SINCE 1900. Credit, 3.
Prerequisites, History 159 and 160 or permission of instructor. Mr. CARY.
191. HISTORICAL BIBLIOGRAPHY.—Training in assembling a bibliography and an introduction to the works of some leading historians. Credit, 1.
Mr. CARY.
192. SEMINAR.—Instruction in the evaluation of source materials and the preparation of reports. Credit, 1.
Mr. CARY.

COURSES FOR MINOR CREDIT ONLY

- 159, 160. HISTORY OF THE UNITED STATES. Credit, 3.
Mr. CARY.

Home Economics

HELEN S. MITCHELL, major adviser

Graduate work is primarily in the field of Nutrition Research or Home Economics Education with an emphasis on foods and nutrition. Those applying for graduate work in Nutrition should have an undergraduate major in Foods and Nutrition or its equivalent with strong offerings in Organic, Biochemistry, Physiology, and Bacteriology. Students applying for graduate work in Home Economics Education should have an undergraduate major in Home Economics with some courses in Education and Practice Teaching. The major work in this field is offered jointly by the School of Home Economics and the Department of Education with certain courses in Education accepted for major credit as listed herewith.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL PROBLEM.—An intensive study of a special problem in the field of Home Economics. This type of problem is recommended instead of a thesis for certain students.

Credit, 3-6.
THE STAFF.

203. ADVANCED NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.—A study is made of energy metabolism and the metabolism of carbohydrates, fats, proteins, and related substances, their role in human nutrition, and physiological effects of dietary inadequacies. A critical evaluation of food value tables and other reference material is made. Students are expected to give special reports from current literature supplementing class discussion.

Credit, 3.
Prerequisites, Physiological Chemistry and/or Physiology. Miss MITCHELL.

204. ADVANCED NUTRITION—MINERALS AND VITAMINS.—A detailed study is made of mineral metabolism, function in the body and the result of deficiencies. The vitamins will be discussed from the standpoint of food distribution, function, chemical nature and stability, assay methods, and result of deficiencies.

Credit, 3.
Miss MITCHELL.
Prerequisite, Home Economics 203, or equivalent.

205. LABORATORY METHODS AND TECHNIQUES IN NUTRITION.—Laboratory course designed to acquaint qualified students with the different types of laboratory techniques that are currently used in nutrition research. These methods include fluorometric, colorimetric, spectrophotometric, and microbiological determinations of various nutrients in foods and biological fluids.

Credit, 3.
1 class hour, one 4-hour lab.
Mrs. WERTZ.
Prerequisites, Quantitative Chemistry, Home Ec. 203, 204, or equivalent.

207. PROBLEMS IN NUTRITION.—Qualified students may be permitted to work on a problem of special interest to them in the fields of vitamin and mineral metabolism, basal metabolism, dietary survey techniques, etc.

Credit, 3.
Prerequisite, Home Ec. 205. Mrs. WERTZ.

209. PROBLEMS IN FOODS.—An advanced study of foods. Designed mainly to equip a student of the science in experimental foods procedures. Special emphasis on individual research problems.

Credit, 3.
Miss DAVIS.
Prerequisites, Home Economics 193, Quantitative Chemistry, or equivalent, and permission of instructor.

210. HOME ECONOMICS SEMINAR.—Readings, reports and discussions on the current literature of the following areas—family relations, family economics, and home management.

Credit, 3.
Mrs. PIATT and Miss MERRIAM.

211, 212. NUTRITION SEMINAR.—Readings, discussions and preparation of bibliographies on nutrition problems of current interest

Credit, 1 each semester.
Miss MITCHELL.

300. THESIS, MASTER'S DEGREE.—Individual research in the field of nutrition and the preparation of an acceptable thesis reporting results and analysis of such studies.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

181. **METHODS OF TEACHING HOME ECONOMICS.**—A study is made of general education philosophy; the application of home economics to the entire school program; development of curricula based upon student needs; exploration of instructional methods and techniques. This course gives credit toward meeting state standards for teachers. During the last month a two-hour laboratory period replaces one lecture.

Credit, 3.

MRS. PIATT.

185. **THEORY AND PRACTICE OF NURSERY SCHOOL MANAGEMENT.**—This course is planned to give students a background in the history and philosophy of the pre-school program; theory and techniques of nursery school practice; children's activities in music, art, literature and sciences; fundamentals of play and use of play material and methods of observation and recording. Supervised participation in child development laboratory as well as field trips to observe special groups.

Credit, 3.

Prerequisite, Home Economics 70.

MRS. THEIS.

187. **PRINCIPLES AND PRACTICES OF TAILORING.**—Emphasis is placed on handling of wool in the making of suits and coats.

Credit, 3.

One class hour; one 4-hour laboratory period.

MRS. WILHELM.

Prerequisite, Home Economics 35 or its equivalent.

188. **APPLIED DRESS DESIGN.**—Costume design through draping and pattern making. An intensive study is made of texture, line, color, and fit as applied to dress design and the figure.

Credit, 3.

One class hour; two 2-hour laboratory periods.

MRS. WILHELM.

Prerequisite, Home Economics 35 or its equivalent.

189. **DIET THERAPY.**—The application of nutrition principles to diet in disease. Recent theories of dietary treatment of gastro-intestinal disorders, obesity, anemia, fevers, diabetes, food allergy, cardiovascular and biliary tract diseases are reviewed critically. Students are required to use and be familiar with current medical literature as it applies to nutritional problems in disease.

Credit, 3.

MRS. COOK.

Prerequisites Home Economics 52 or 103 and 104; Physiological Chemistry; Physiology.

193. **EXPERIMENTAL FOODS.**—The testing and comparing of different food materials and methods of preparation, including advanced work in the science and techniques of cookery. Special individual problems will be studied.

Two class hours; One 3-hour laboratory period

Credit, 3.

MISS DAVIS.

Prerequisites Home Economics 30 and 51; Chemistry 32 and 33 or equivalent, and permission of the instructor.

198. **PROBLEMS IN HOME ECONOMICS.**—An intensive study of some phase of home economics.

Credit, 3.

By permission of the Dean of the School.

THE STAFF.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Chemistry 234.	ADVANCED BIOCHEMICAL LECTURES.	Credit, 3. Mr. LITTLE.
Chemistry 235.	BIOCHEMISTRY LABORATORY METHODS.	Credit, 3. Mr. LITTLE.
Chemistry 237.	BIOCOLLOIDS.	Credit 3. Mr. BENNETT.
Chemistry 239.	CHEMISTRY OF NATURAL PRODUCTS.	Credit, 2. Mr. LITTLE.
Education 153.	EDUCATIONAL TESTS AND MEASUREMENTS.	Credit, 2-3. Mr. ROURKE.
Education 166.	PREPARATION AND USE OF AUDIO-VISUAL AIDS.	Credit, 2-3. Mr. WYMAN.
Education 291.	EDUCATIONAL RESEARCH AND STATISTICS.	Credit, 2. Mr. PURVIS.
Food Technology 191, 192.	EXAMINATION OF FOOD PRODUCTS.	Credit, 3 each semester. Mr. FELLERS, and Mr. NEBESKY.

COURSES FOR MINOR CREDIT ONLY

152. NUTRITION AND DIETETICS.—A study is made of the fundamentals of normal nutrition including energy needs, the metabolism of proteins, carbohydrates, fats, vitamins, and minerals; and the quantitative requirements for these various essential nutrients. Laboratory work provides the further study of the composition of foods and their contribution to the diet and the relationship of the nutritive value to cost. Nutritive loss due to cooking, storage, etc., is given consideration.

Three class hours, one 2-hour laboratory period. Credit, 3.
Prerequisites, Home Ec. 30, Chemistry 31 and 32, or Physiology. Mrs. Cook.

170. CHILD DEVELOPMENT.—The growth and development of the child, his basic needs, the aspects of behavior—routine, creative and social—as they are related to personality development. Planned observation and participation in the Nursery School.

Three class hours; laboratory by arrangement. Credit, 3.
Mrs. THIES.

175. ECONOMICS OF THE HOUSEHOLD.—A study is made of personal and family standards of living in the modern home, the economic relations of the household, and the use of time, energy, and money as a means to influence the home situation.

Credit, 3.
Prerequisite, Economics 25, or equivalent. Miss MERRIAM.

180. FAMILY LIFE.—A study is made of the modern family; ideals and responsibilities of the home and the individual's share in developing positive family relationships.

Credit, 3.
Mrs. PIATT.

191, 192. INSTITUTIONAL FOODS AND MANAGEMENT.—A study is made of the principles of organization, personnel management, the administration, food costs, operating expenses, and the special functions of the dietitian. Laboratory work is arranged at one of the University Dining Halls and field trips are planned. It

is expected that students will enroll for the work of both semesters. Students wishing to qualify for administrative institutional work are advised to take Economics 81.

Two class hours; one 3-hour laboratory period.

Credit, 3 each semester.

Prerequisites, Home Economics 51 and 52

MISS STEEN.

Landscape Architecture

RAYMOND H. OTTO, major adviser.

COURSES OPEN TO GRADUATE STUDENTS ONLY.

(For either major or minor credit)

290. THEORY.—Special studies in the history and theory of art and landscape architecture.

Credit, 3.

Mr. McLINDON.

291. DESIGN.—Individual problems in any or all branches of public and private work.

Credit, 3.

Mr. OTTO.

292. CONSTRUCTION.—Individual problems by arrangement, including estimating, cost accounting, and methods of construction.

Credit, 3.

Mr. PROCOPIO.

293. PRESENTATION.—Studies in drafting, pen and crayon, rendering, water coloring, etc.

Credit, 3.

Mr. MACIVER.

294. PRACTICE.—Professional field work under supervision, conducted upon going projects as opportunity offers.

Credit, 3

Mr. BLUNDELL.

297. ARCHITECTURE.—Selected problems as related to landscape architecture.

Credit, 3.

Mr. McLINDON.

300. THESIS, MASTER'S DEGREE.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

175. ART APPRECIATION.—An analysis of the principles of critical judgment underlying the fine arts.

Credit, 3.

Mr. OTTO.

178. HISTORY OF ART.—Continuation of 177 beginning with the Renaissance period to modern times.

Credit, 3.

Mr. HAMILTON.

179. CONSTRUCTION AND MAINTENANCE.—A study of methods and materials of construction, and maintenance procedures.

Credit, 3.

Mr. PROCOPIO.

180. LITERATURE OF LANDSCAPE ARCHITECTURE.—A review of the significant literature of all phases of the field, and compiling of bibliographies.

Credit, 2.

Mr. McLINDON.

181. ADVANCED DESIGN.—Class "B" Exchange Problems plus specialized study through local projects. Credit, 3.

Prerequisites, Landscape Architecture 153, 154. Mrs. HAMILTON.

182. ADVANCED DESIGN. Continuation of 181. Credit, 3.

Mr. HAMILTON.

183. ARCHITECTURE.—The history of architectural development including styles and construction principles. Credit, 3.

Mr. McLINDON.

184. SKETCHING.—Presentation of varied subjects in water color and other mediums. Credit, 2.

Mr. MACIVER.

186. CITY PLANNING.—A critical examination of those factors which influence and guide the physical growth and arrangement of communities in harmony with their social and economic needs. Open to non-majors. Three class hours. Credit, 3.

Mr. McLINDON.

187. CITY PLANNING.—An application of the principles of modern civic art through a series of problems on the design of various types of urban land areas. Three 2-hour laboratory periods. Credit, 3.

Prerequisite, Landscape Architecture 186. Mr. McLINDON.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 153. AGROSTOLOGY. Credit, 3.

Mr. DICKINSON.

Agronomy 156. AGROSTOLOGY. Credit, 3.

Mr. DICKINSON.

Botany 181. PLANT ECOLOGY. Credit, 3.

Mr. LIVINGSTON.

Floriculture 181. HERBACEOUS GARDENS AND BORDERS. Credit, 3.

Mr. HUBBARD.

COURSES FOR MINOR CREDIT ONLY

151. ELEMENTS OF TOPOGRAPHY AND CONSTRUCTION.—Contour interpolation, grading and drainage plans, drive design, sections and profiles, computation of earthwork. Credit, 3.

Mr. PROCOPIO.

152. CONSTRUCTION DETAILS.—Problems in structural garden features as walks, steps, walls, gates, pools, and architectural elements. Credit, 3.

Mr. PROCOPIO.

153. GARDEN DESIGN.—Fundamental principles of composition as applied to the design of gardens and small properties. Credit, 3.

Mr. OTTO.

154. GENERAL DESIGN.—A series of problems in the design of private and public areas. Credit, 3.

Mr. OTTO.

FOR THE DEGREE OF BACHELOR OF LANDSCAPE ARCHITECTURE

To receive this professional bachelor's degree each candidate will be required:

1. To have received the degree of Bachelor of Science or Bachelor of Arts from a recognized institution, and stand in the upper half of his class.
2. To have completed as a prerequisite 24 semester credits in technical courses in landscape architecture, substantially equivalent to the technical courses now required in the undergraduate major in landscape architecture at this college.
3. In addition, to have completed in residence at this institution, 30 credits in landscape architecture and closely related subjects prescribed by the department. (See Fifth Year Program below.)
4. To have received the unanimous approval of the faculty of the department and the vote of approval of the faculty of the Graduate School.

FIFTH YEAR PROGRAM

The regular program of studies for the Fifth Year, subject to minor changes dependent upon courses taken previously, is as follows:

First Semester

201. GENERAL DESIGN.—Class A Exchange problems and advanced local projects.

Credit, 3.

Mr. OTTO.

203. ECOLOGY AND PHYSIOGRAPHY.—Plant Associations and ground forms and conditions as related to each other.

Credit, 3.

Mr. BLUNDELL.

205. ARCHITECTURE.—Studies in principles and problems of architectural design.

Credit, 3.

Mr. McLINDON.

207. CONTRACTS, SPECIFICATIONS, ESTIMATING COSTS.—Preparation of supporting data for proposed plans.

Credit, 3.

Mr. HAMILTON.

209. LANDSCAPE SKETCHING.—Graphic expression of suitable subjects in various media.

Credit, 3

Mr. MACIVER.

Second Semester

202. GENERAL DESIGN.—Continuation of 201.

Credit, 3.

Mr. OTTO.

204. LANDSCAPE FORESTRY.—Woodland management and silvicultural practices.

Credit, 3.

Mr. STICKEL.

206. ARCHITECTURE.—Studies in principles and problems of architectural design.

Credit, 3.

Mr. McLINDON.

210. ARCHITECTURAL SKETCHING.—Graphic expression of suitable subjects in various media.

Credit, 3.

Mr. MACIVER.

212. PROFESSIONAL PRACTICE.—Methods and procedures of the professional office.

Credit, 1.

Mr. OTTO.

Elective: Suitable subject assigned.

Mathematics

ALLEN E. ANDERSEN, major adviser.

Special Departmental Entrance Requirements:

Candidates for admission who plan to major in this department must have completed at least eighteen semester credit hours in undergraduate mathematics beyond the content of Mathematics 29 and 30 (Differential and Integral Calculus), and also an undergraduate course equivalent to Physics 25 and 26 (Introductory).

Special Degree Requirements:

Six semester credit hours (undergraduate or graduate) in each of the fields of geometry, algebra and applied mathematics and 12 semester credit hours in the field of analysis. A minimum of 12 semester credit hours chosen from courses in this department which are numbered from 200 to 299.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. TOPICS COURSE.—This course is designed to give the student training in independent study. Readings and reports will be assigned. Weekly conferences will be held between student and instructor. Topics may be chosen from the fields of algebra, geometry, theory of functions, and applied mathematics. Prerequisite, Consent of instructor. Credit, 1, 2, or 3.

Mr. ANDERSEN, Miss CULLEN, Mr. ROSE, and Mr. WAGNER.

201, 202. INTRODUCTION TO MODERN ALGEBRA.—Axiomatic foundation of algebra; groups, rings, fields and vector spaces; linear transformation and matrices. Credit, 3 each semester.

3 class hours.

Mr. ROSE.

Prerequisite, consent of instructor.

221, 222. THEORY OF FUNCTIONS OF A REAL VARIABLE.—The real number system, limits, continuity and differentiability of functions of one and two real variables, theories of integration, sequences of functions.

3 class hours.

Credit, 3 each semester.

Mr. WAGNER.

Prerequisite, Mathematics 191.

226. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE.—The complex number system, elementary functions and their mappings, line and contour integrals, expansion and representations of analytic functions, introduction to analytic continuation and Riemannian surfaces. Credit, 3.

3 class hours.

Miss CULLEN.

Prerequisite, Mathematics 221.

241. TOPOLOGY I.—Point Set Topology: Calculus of sets; Topological, Hausdorff and metric spaces; continuous mappings; homeomorphisms; connectivity and compactness. Credit, 3.

Prerequisite, Mathematics 194.

Miss CULLEN.

242. TOPOLOGY II.—Combinatorial Topology: Continuous complexes; Jordan's Theorem, Homology and Homotopy. Credit, 3.

Prerequisite, Mathematics 241.

Miss CULLEN.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

151. **MODERN SYNTHETIC GEOMETRY.**—An extension of the geometry of the triangle and the circle. The course is intended especially for those planning to be high school teachers. Credit, 3.

Three class hours.

Mr. ANDERSEN.

Prerequisite, Mathematics 30.

153. 154. **HIGHER ALGEBRA.**—Permutations, Combinations, probability; mathematical induction, matrices, determinants, linear equations and dependence; quadratic forms and elimination theory; the complex number system; polynomial equations; elementary theory of groups, rings and fields. Credit, 3.

Prerequisite, Mathematics 10.

THE STAFF.

156. **FINITE DIFFERENCES AND PROBABILITY.**

Three class hours.

Credit, 3.

Prerequisite, Mathematics 30. Given in alternate years, beginning 1952-53.

Mr. WAGNER.

162. **STATISTICS.**—The fundamental mathematical principles of statistical analysis. The derivation of the basic formulas used, and the study and discussion of such topics as averages, dispersion, skewness, curve fitting, least squares, linear and curvilinear correlation, probability curve, probable error, sampling, reliability.

Three class hours.

Credit, 3.

Prerequisite, Mathematics 10.

Mr. WAGNER.

166. **INTRODUCTION TO HIGHER GEOMETRY.**—A study of various methods employed in the modern treatment of geometry of points, lines, and conics. Such topics as homogeneous point and line coordinates; infinite elements; harmonic division; groups of transformations and their invariants; and the elements of projective and other geometries will be considered. Given in alternate years, beginning 1953-54.

Credit, 3.

Prerequisite, Mathematics 30.

Mr. ANDERSEN.

171. **VECTOR ANALYSIS.**—The algebra and calculus of vectors. Applications to physics and other fields will be considered. Given in alternate years, beginning 1952-53.

Credit, 3.

Mr. ANDERSEN.

172. **HISTORY OF MATHEMATICS.**—Topics considered include classical problems and concepts of mathematics and the lives and times of the great mathematicians. This course is recommended especially for prospective high school teachers. Given in alternate years, 1952-53.

Three class hours.

Credit, 3.

Mr. ROSE.

Prerequisite, Mathematics 30.

174. **THEORY OF NUMBERS.**—Euclid's Algorithm, Theory of Prime Numbers, Aliquot parts, congruences, further topics in Number Theory.

Three class hours. Given in alternate years, beginning 1953-54.

Credit, 3.

Prerequisite, Mathematics 30.

THE STAFF.

181. **DIFFERENTIAL GEOMETRY.**—Theory of the geometry of curves and surfaces in three dimensions.

Three class hours. Given in alternate years, beginning 1953-54.

Credit, 3.

Prerequisite, Mathematics 30.

THE STAFF.

183. COMPUTATIONAL METHODS.—Errors and approximations in computation, methods of approximating roots of equations, approximation of functions, empirical curve fitting, approximate integration, and numerical integration of ordinary differential equations.

Three class hours. Given in alternate years, beginning 1952-1953. Credit, 3.

Prerequisite, Mathematics 30.

THE STAFF.

192. DIFFERENTIAL EQUATIONS.

Three class hours.

Credit, 3.

THE STAFF.

Prerequisite, Mathematics 30.

193. ADVANCED CALCULUS.—The real number system, sequences, elementary theory of functions of one variable and of several variables, Riemannian integration, line integrals, Green's theorem.

Three class hours.

Credit, 3.

Prerequisite, Mathematics 91.

THE STAFF.

194. ADVANCED CALCULUS.—Double and triple integrals, improper integrals, gamma functions, Beta functions, elliptic functions, calculus of variations, Fourier Series, Laplace Transforms.

Three class hours.

Credit, 3.

Prerequisite, Mathematics 193.

THE STAFF.

COURSES FOR MINOR CREDIT ONLY

155. MATHEMATICS OF FINANCE.—The mathematical principle of simple and compound interest; annuities, depreciation, valuation of bonds, insurance, building and loan associations. The development and application of aids to computation in problems arising from financial transactions.

Credit, 3.

Prerequisite, Mathematics 8 or 10.

Mr. BOUTELLE.

160. SPHERICAL TRIGONOMETRY AND SOLID ANALYTICAL GEOMETRY.—The trigonometry of the sphere with application to terrestrial and celestial problems. This is followed by a study of higher plane curves and the analytic representation of points, lines and surfaces in space. Given in alternate years, beginning 1951-52.

Credit, 3.

Prerequisite, Mathematics 30.

Mr. BOUTELLE.

191. INTERMEDIATE CALCULUS.—Series, expansion of functions, partial differentiation, envelopes and multiple integrals.

Credit, 3.

3 class hours.

THE STAFF.

Prerequisite, Mathematics 30.

Mechanical Engineering

MAURICE E. BATES, major adviser

At least 12 credits (including thesis) must be obtained in the bracket of courses open to graduate students only.

POWER OPTION

REQUIRED COURSES

First Semester

- M.E. 201 ADVANCED THERMODYNAMICS I.
M.E. 231 ADVANCED INTERNAL COMBUSTION ENGINES.
M.E. 300 RESEARCH & THESIS.

Second Semester

- M.E. 202 ADVANCED THERMODYNAMICS II.
M.E. 234 GAS TURBINES.
M.E. 300 RESEARCH & THESIS.

RECOMMENDED ELECTIVES

First Semester

M.E. 221	HEAT TRANSFER.
M.E. 241	ADVANCED DYNAMICS.
E.E. 201	ENGINEERING ANALYSIS I.

Second Semester

M.E. 254	LUBRICATION & BEARINGS.
E.E. 202	ENGINEERING ANALYSIS II.
M.E. 183	MACHINE DESIGN.
M.E. 190	ADVANCED METALLURGY.
M.E. 194	EXPERIMENTAL MECHANICAL ENGINEERING.

DESIGN OPTION

REQUIRED COURSES

M.E. 241	ADVANCED DYNAMICS.	M.E. 254	LUBRICATION & BEARINGS.
M.E. 251	ADVANCED TOPICS IN MACHINE DESIGN.	C.E. 188	ADVANCED STRESS ANALYSIS.
M.E. 300	RESEARCH & THESIS.	M.E. 300	RESEARCH & THESIS.

RECOMMENDED ELECTIVES

First Semester

M.E. 201	ADVANCED THERMODYNAMICS I.
M.E. 221	HEAT TRANSFERS.
M.E. 231	ADVANCED INTERNAL COMBUSTION ENGINES.
E.E. 201	ENGINEERING ANALYSIS I.

Second Semester

M.E. 202	ADVANCED THERMODYNAMICS II.
M.E. 234	GAS TURBINES.
E.E. 202	ENGINEERING ANALYSIS II.
M.E. 183	MACHINE DESIGN.
M.E. 188	STEADY FLOW MACHINERY.
M.E. 190	ADVANCED METALLURGY.
M.E. 194	EXPERIMENTAL MECHANICAL ENGINEERING.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. ADVANCED THERMODYNAMICS.—Advanced course in engineering applications of thermodynamics, including a survey of the physical treatment of thermodynamics. Credit, 3.

Prerequisite, M. E. 164.

Mr. ATHERTON and Mr. SWENSON.

202. ADVANCED THERMODYNAMICS.—A continuation of the work in 201. Mechanical engineering problems in thermodynamics. Credit 3.

Prerequisite, M. E. 201.

Mr. ATHERTON and Mr. SWENSON.

221. HEAT TRANSFER.—Fundamentals of heat transfer by convection, conduction and radiation, with engineering applications. Credit, 3.

Prerequisite, M. E. 164.

Mr. SWENSON and Mr. ATHERTON.

231. ADVANCED INTERNAL COMBUSTION ENGINES.—Theoretical consideration of fuels, combustion, detonation, lubrication, supercharging, carburetion, and fuel injection as related to gasoline and Diesel engines. Credit, 3.

Prerequisite, M. E. 177.

Mr. DITTFACH.

234. GAS TURBINES.—Thermodynamic principles, performance and application of gas turbines as primary and auxiliary power units. Credit, 3.

Prerequisite, M. E. 164.

Mr. SWENSON and Mr. DITTFACH.

241. ADVANCED DYNAMICS.—Vibration and stability of systems with many degrees of freedom, normal modes and frequencies; approximate methods. Non-linear systems, self excited vibrations. Gyroscopic effects in mechanical systems. Selected topics of applications to problems in engineering.

Credit, 3.

Prerequisite, M. E. 185.

Mr. WHITE.

251. ADVANCED TOPICS IN MACHINE DESIGN.—Application of advanced theories in elasticity and strength of materials to machine design. Topics covered include energy methods, stability, stress concentration and fatigue.

Credit, 3.

Prerequisite, M. E. 186.

Mr. SOBALA and Mr. BATES.

254. LUBRICATION AND BEARINGS.—Derivation of a generalized Reynold's equation and its application to analysis of sliders, tilted pad bearings, journal bearings, partial bearings, and thrust bearings, thermal equilibrium in bearings, bearing loads and design practices.

Credit, 3.

Prerequisites, M. E. 186 and C. E. 76.

Mr. BATES and Mr. WOLOWICZ.

300. THESIS, MASTER'S DEGREE.

Credit, 3-6.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

146. FUNDAMENTALS OF METALLURGY.—Physical metallurgy involving crystal structure, solid solutions, diffusion in the solid state, freezing of metals, hardening of metals, annealing, and equilibrium diagrams. These fundamentals are then applied to the study of the iron-iron carbide diagram, the S-curve, heat treatment of steel and the properties and uses of the other principal engineering metals. Laboratory work stresses metallographic and radiographic technique.

Two class hours; one 3-hour laboratory period.

Credit, 3.

Prerequisites, M. E. 39 or Chemistry 66.

Mr. KEYSER.

175. STEAM POWER PLANTS.—This course is a study of the steam power plants, including boilers, stokers, fuels, combustion, steam generation, prime movers, and auxiliary equipment, problems involved in design and operation. Three class hours, one 2-hour laboratory period.

Credit, 3.

Prerequisite M. E. 164.

Mr. SWENSON and Mr. ATHERTON.

176. REFRIGERATION AND AIR CONDITIONING.—The course content includes a study of the fundamental principles of thermodynamics as applied to refrigeration and air control. Application of refrigeration to industrial processes and the control of temperature, humidity and motion of air in buildings will be studied.

Two class hours, one 3-hour laboratory period.

Credit, 3.

Mr. SWENSON and Mr. ATHERTON.

Prerequisite, M. E. 164.

177. INTERNAL COMBUSTION ENGINES.—A study is made of spark-ignition and compression-ignition engines including design, fuels, carburetion, ignition, combustion, lubrication, cooling, and engine performance. The gas turbine and jet propulsion will be included.

Credit, 3.

Three class hours.

Mr. DITTFACH.

Prerequisite M. E. 164.

183. MACHINE DESIGN.—Principles involved in the design of various machine parts including fastenings, shafts, belts, bearings, gears, and pressure vessels.

Two class hours; one 3-hour laboratory period.

Credit, 3.

Prerequisites, C. E. 51 or 53; M. E. 68.

Mr. BATES.

185. DYNAMICS OF MACHINERY.—Gyroscopic effects, governors, dynamic balancing of rotating machinery. Analysis of unbalanced forces in a machine containing parts moving with rotation, reciprocation, and their combination. Elements of vibration theory, vibration isolation, vibration analysis of equivalent masses and shaft systems. Vibration absorbers.

Credit, 3.

Three class hours.

Mr. SOBALA.

Prerequisites, C. E. 52, M. E. 168.

186. ADVANCED MACHINE DESIGN.—A continuation of Course 183. Additional elementary parts are studied which combine into the design of complete machines in the latter part of the course.

Credit, 3.

Two class hours, one 3-hour laboratory period.

Mr. BATES.

Prerequisite, M. E. 183.

188. STEADY FLOW MACHINERY.—The principles of thermodynamics are applied to steam and internal combustion turbines, condensers, and other heat transfer apparatus.

Credit, 3.

Three class hours.

Mr. SWENSON.

Prerequisites, M. E. 164 or 166, and C. E. 76.

190. ADVANCED METALLURGY.—Mechanical metallurgy covering the behavior of metals in the plastic state; the shaping of metals by mechanical means such as drawing, rolling, spinning, etc.; the primary methods of metal fabrication such as casting, welding, powder metallurgy, electroforming; the metallurgical applications of radiography.

Credit, 3.

Two class hours, one 3-hour laboratory period.

Mr. KEYSER.

Prerequisite, M. E. 146.

194. EXPERIMENTAL MECHANICAL ENGINEERING.—Special work in Mechanical Engineering.

Credit, 3.

Prerequisite, Permission of Instructor.

THE STAFF.

Industrial Engineering

175. JOB EVALUATION.—A study of the principles used to determine an evaluation of all occupations in order to establish an equitable rating between them, to establish sound wage and salary policies.

Credit, 2.

Three class hours.

Mr. WEAVER.

Prerequisite, I. E. 51.

176. TIME STUDY.—A study of the principles involved in the establishment of production standards and their application in the management functions of cost accounting, estimating, production control, incentives, budgetary control.

Credit, 3.

Two class hours, one 3-hour laboratory period.

Mr. WEAVER.

Prerequisites, I. E. 175, 182 concurrently except for Business Administration majors.

177. PRODUCTION CONTROL.—A study of the principles used to regulate production activities in keeping with the manufacturing plan.

Credit, 3.

Three class hours.

Mr. EMERSON.

Prerequisite, I. E. 51.

178. **FACTORY PLANNING AND LAY-OUT.**—A study of the principles applying to the determination and development of the physical relationship between plant, equipment and operators working toward the highest degree of economy and effectiveness in operation. Credit, 2.

One class hour, one 3-hour laboratory period.

Mr. SOBALA.

Prerequisites, M. E. 2 and I. E. 51.

180. **PLANT BUDGETARY CONTROL.**—A study of the principles used to pre-determine expenses for the factors of production and the comparison of results with the estimates to determine and deal with the causes of expense variations as applied by the operating organization in the industrial plant. Credit, 3.

Three class hours.

Prerequisite, I. E. 51.

Mr. WEAVER.

182. **WORK SIMPLIFICATION.**—A study of the principles involved in the simplification of means of doing work and in the application and use of these principles.

One class hour, one 3-hour laboratory period.

Credit, 2.

Prerequisites, M. E. 68 and I. E. 176 concurrently.

Mr. WEAVER.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Electrical Engineering 201, 202, **ADVANCED ENGINEERING ANALYSIS.**

Credit, 3 each semester

Mr. ROYS and STAFF.

Civil Engineering 188. **ADVANCED STRESS ANALYSIS.**

Credit, 3.

Mr. WHITE.

Olericulture

GRANT B. SNYDER, major adviser

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201. **LITERATURE.**—A critical study and analysis of selected scientific papers and reports of past and current research involving vegetable crops. Credit, 3.

Lectures and assigned readings.

Mr. LACHMAN.

Horticulture 211, 212. **SEMINAR.**—Each student will be required to present papers on assigned readings related to research work in Horticulture. Departments of Floriculture, Olericulture, and Pomology cooperating.

Credit, 1 each semester.

THE STAFF.

276. **ADVANCED VEGETABLE PLANT IMPROVEMENT.**—An intensive study of hybridization and selection as related to specific vegetable crops. Special attention will be given to heterosis and its implications in vegetable breeding as well as sterility and its place in seed production of F1 hybrids. Credit, 3.

Prerequisites, Plant Breeding 152, Zoology 153 or equivalent.

Mr. LACHMAN and Mr. YOUNG.

300. **THESIS, MASTER'S DEGREE.**—Research on some approved topic relating to a specific phase of Olericulture. Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

152. **ADVANCED COMMERCIAL CULTURE.**—A critical analysis of the factors involved in the commercial culture of vegetable crops including soils, nutrition and the relationship of temperature, light and humidity to production techniques and practices both out of doors and in the greenhouse. Credit, 3.
Lectures and laboratory. Mr. SNYDER.

173. **MARKETING AND STORAGE OF VEGETABLE CROPS.**—A detailed evaluation of factors which may be involved in the market and storage handling of vegetables with particular emphasis on their relationship to quality and deterioration. Credit, 3.
Mr. SNYDER.

175. **ADVANCED SYSTEMATIC OLERICULTURE.**—A critical study of vegetable plants as to plant characteristics, nomenclature, identification and classification. Credit, 3.
Mr. SNYDER.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 263. **CHEMISTRY OF THE SOIL.** Credit, 3.
Mr. STECKEL.

Agronomy 264. **EXPERIMENTAL METHODS IN AGRONOMY.** Credit, 3.
Mr. YEGIAN.

Botany 158. **MICROTECHNIQUE.** Credit, 2.
Mr. TORREY.

Plant Breeding 152. **ADVANCED PLANT BREEDING.** Credit, 3.
Mr. FRENCH.

Plant Breeding 181. **PLANT CYTOLOGICAL TECHNIQUE.** Credit, 2.
Mr. FRENCH.

Plant Breeding 182. **SPECIAL PROBLEM IN PLANT BREEDING.** Credit, 2.
Mr. FRENCH.

COURSES FOR MINOR CREDIT ONLY

151. **PRINCIPLES OF OLERICULTURE.** Credit, 3.
Mr. TUTTLE.

174. **MARKETING PRACTICES.** Credit, 3.
Mr. SNYDER.

178. **COMMERCIAL OLERICULTURE.** Credit, 3.
Mr. SNYDER.

Philosophy

HARRY N. GLICK, major adviser

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

266. **PHILOSOPHY OF EDUCATION.**—An evaluation of various educational theories and practices viewed in the light of historical perspective and contemporary thought.

Credit, 3.

Mr. GLICK.

267. **ORIENTAL PHILOSOPHY.**—A study of oriental thought, and its influence upon the modern cultures and ideologies of the Orient—primarily India, China, and Japan.

Credit, 3.

Mr. GLICK.

271. **SOCIAL PHILOSOPHY.**—Starting with an analysis of the present world situation, attention will be given to conflicting claims regarding the basis on which social orders are to be criticized. An attempt will be made to formulate a philosophical foundation for democratic society.

Credit, 3.

Mr. SHUTE.

286. **CONTEMPORARY PHILOSOPHY.**—Representative thinkers of the twentieth century will be read, including Bergson, Dewey, Whitehead, and others selected in conference with the class.

Credit, 3.

Mr. SHUTE.

289, 290. **SEMINAR.**—Conferences and reports on special studies in philosophy.

Credit, 1-3.

THE STAFF.

300. **THESIS, MASTER'S DEGREE.**

Credit, 10

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

(These courses require extra work for 3 credits)

163. **LOGIC.**—A study of the principles, problems, and methods of critical thinking with applications to current problems.

Credit, 2-3.

Mr. GLICK.

164. **ETHICS.**—A survey of ethical theories both historical and contemporary, and an attempt to evaluate these with reference to modern ethical problems.

Credit, 2-3.

Mr. GLICK.

181. **PHILOSOPHY OF RELIGION.**—A survey of the contrasting types of religious philosophy in the contemporary western world and Asia, with a critical and constructive study of basic issues, such as the meaning of knowledge in the field of religion, the nature of faith, and the religious interpretation of reality.

Credit, 2-3.

Mr. SHUTE.

182. **AESTHETICS.**—A study of the leading modern theories of the nature of art, the analysis of aesthetic experiences, the distinctive function of art in culture and personality, and the principles of criticism.

Credit, 2-3.

Mr. SHUTE.

183. READINGS IN ANCIENT PHILOSOPHY.—Selections are read from Plato's dialogues and from the works of Aristotle. A study is made of the leading philosophical issues discussed by these writers, with emphasis on ideas which became basic in the development of western thought.
Credit, 2-3.

Mr. SHUTE.

184. READINGS IN MODERN PHILOSOPHY.—Selections are read from Locke, Hume, Kant, and Whitehead, to display the leading ways in which modern thinkers have looked upon the nature of the universe and the possibilities and limitations of knowledge.
Credit, 2-3.

Mr. SHUTE.

185. METAPHYSICS.—The field of metaphysics defined in distinction from the field of science; contrasting theories of reality offered by contemporary naturalism and idealism, especially in the light of recent developments in biological and physical science; analysis of basic ideas which will enable the student to continue a fruitful development of his own philosophy.
Credit, 2-3.

Mr. SHUTE.

186. THEORY OF KNOWLEDGE.—Types of knowledge and correlated methods of knowing; questions of certainty, probability, and limits of knowledge; ways of expression, such as mathematical formulae, language, and art, and their involvement in the knowing process; the nature of the relation between the knowing subject and the known object.
Credit, 2-3.

Mr. SHUTE.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Government 171. ANCIENT AND MEDIEVAL POLITICAL THOUGHT. Credit, 3
Mr. _____.

Government 172. MODERN POLITICAL THOUGHT. Credit, 3.
Mr. _____.

COURSE FOR MINOR CREDIT ONLY

162. HISTORY OF PHILOSOPHY.—A survey of western thought from the early Greeks to the present.
Credit, 3.

Mr. GLICK and Mr. SHUTE.

Physical Education for Men

WARREN P. MCGUIRK, major adviser.

Work at the graduate level is based upon thorough preparation in the biological sciences, physical sciences, social sciences and related subjects, and in the fundamentals of education.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL PROBLEMS IN PHYSICAL EDUCATION.—Selecting and defining possible problems; methods of scientific research and actual presentation and discussion of research work in physical education, health and safety education or athletics.
Credit, 3 each semester.

Prerequisites, Physical Education 55, 154.

Mr. GORE, Mr. SALWAK and THE STAFF.

239. CORRECTIVE PHYSICAL EDUCATION.—Consideration of the organization of corrective or adaptive recreative program for the physically handicapped.
Credit, 3.

Mr. RICCI.

Prerequisites, Biology (Zoo. 1 and Botany 1), physiology (Zoo. 35), Physics 25, P. E. 51, 152.

260. SEMINAR IN PHYSICAL EDUCATION.—Physical Education theory and philosophy involving intensive study of the works of eminent authors who have made fundamental contributions to the field; the philosophical factors underlying past and future considerations of health and physical education; special attention is given to the various forces influential in changing one's philosophy of health and physical education.
Credit, 1-3.

Prerequisites, P. E. 27 or 154, 175.

Mr. MCGUIRK.

262. INTEGRATION OF PHYSICAL EDUCATION AND THE PHYSICAL AND BIOLOGICAL SCIENCES.—The inter-relationship of anatomy, physiology, chemistry, physics, biology to physical education. Collecting and classifying scientific facts which form the foundations of policies, principles, objectives and standards of physical education.
Credit, 3.

Prerequisites, P. E. 51, 152.

Mr. SALWAK.

264. TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION.—Critical study of tests and measurements available in physical education; methods of constructing and evaluating new tests and measurements; includes sampling, tests of significance, analysis of variance and other statistical methods.
Credit, 3.

Prerequisite, P. E. 55.

Mr. SALWAK.

285. THE HISTORY AND TRENDS OF PHYSICAL EDUCATION.—An interpretation of the traits, customs and beliefs which have influenced the development of Physical Education and a condensed evaluation of the several systems prevailing today.
Credit, 2.

Prerequisites, P. E. 21, 56, Education 151.

Mr. LORDEN.

300. THESIS, MASTER'S DEGREE.—Selecting, defining, and studying a problem in physical education, athletics, health, safety education, or recreation. Use of scientific method as applied to the field.
Credit, 8.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

In addition to the standard requirements of the courses, graduate students must work on a special project requiring research with a resultant term paper.

152. APPLIED ANATOMY AND KINESIOLOGY.—An investigation and analysis of human motion and the processes of motor functioning.
Credit, 3.

Prerequisite, Physical Education 51.

Mr. KAUFFMAN.

154. PHYSICAL EDUCATION.—SECONDARY SCHOOLS.—This course includes the objectives, significance, organization and content of physical education in junior and senior high school. The course is correlated with the requirements of the State Department of Education.
Credit, 3.

Mr. DERBY.

174. RECREATION LAND USE.—Recreational resources—recreational needs of the people—geography of recreation—some competitors of recreational land use—economic aspects of recreation—federal lands, state, interstate and local systems—park educational work—the national plan.
Credit, 3.

Mr. GORE.

175. **PHYSICAL EDUCATION ORGANIZATION AND ADMINISTRATION.**—Problems and procedures in physical education, organization of program, class schedules, classification of students, equipment, records, finance, intramurals, construction and maintenance of gymnasias, swimming pools, locker rooms, and outdoor play areas.

Credit, 3.

Mr. McGUIRK.

179. **ADAPTIVE PHYSICAL EDUCATION.**—A program for developmental activities, presentation of significant current problems and new developments in methods and materials for atypical or physically handicapped students.

Credit, 3.

Prerequisite, Physical Education 52.

Mr. KAUFFMAN and Mr. RICCI.

185. **SAFETY EDUCATION.**—This course is designed to acquaint the student with the objectives and materials of effective teaching of safety education in the elementary schools. Emphasis will be centered on content selection and grade placement of materials to be used in the classroom.

Credit, 3.

Mr. GORE.

186. **DRIVER EDUCATION AND DRIVER TRAINING.**—This course covers development of driver training: objectives, scope, content, and problems; teaching materials; school responsibilities in traffic safety and driver training; psycho-physical tests; skill-developing exercises; road tests; motor vehicle construction, operation, and maintenance; rules of the road, and advanced driving practices; administrative standards; practice teaching and behind-the-wheel instruction.

Credit, 2.

Mr. BRIGGS.

Physics

COURSES FOR MINOR CREDIT ONLY

151, 152. **MAGNETISM, ELECTRICITY, PHOTO-ELECTRICITY, THERMIONICS AND APPLICATIONS.**—Course 151 deals largely with direct currents; Course 152 with alternating currents, applications of thermionics, and photo-electricity.

Two class hours, one 2-hour laboratory period.

Credit, 3 each semester.

Prerequisites, Physics 26 and Math. 29.

Mr. POWERS.

155, 156.—**MECHANICS.**—Development of the fundamental concepts of classical dynamics with applications to particles and rigid bodies in translation and rotation.

Credit, 3 each semester.

Prerequisites, Physics 26 and Math. 30.

Mr. ROSS.

160. **SOUND AND ACOUSTICS.**—A study of the vibrations, vibrating bodies, coupled systems, sound structure, and acoustic properties.

Credit, 3.

Prerequisite, Physics 155 or equivalent.

Mr. ALDERMAN.

161, 162. **HEAT AND THERMODYNAMICS.**—A study of heat exchanges and energy changes due to heat in systems of matter.

Credit, 3 each semester.

Two class hours, one 2-hour laboratory period.

Mr. ALDERMAN.

163, 164. **OPTICS.**—An intermediate course in the theory of light. Geometrical and physical optics.

Credit, 3 each semester.

Two class hours, one 2-hour laboratory period.

Mr. ALDERMAN.

175, 176. **ADVANCED EXPERIMENTAL WORK IN SELECTED TOPICS.**—These courses are largely experimental and the subject matter is adapted to the needs of the individual student.

Credit, 3 each semester.

One class hour, two 2-hour laboratory periods.

Mr. WANNLUND.

Prerequisites, Physics 151, 152 or 155, 156 or 163, 164; and Math. 29 and 30.

185, 186. MODERN PHYSICS.—Typical subjects studied are theories of the atom, radiation, quantum theory; spectra, X-ray analysis, nuclear reactions. Given in alternate years, beginning 1951-52. Credit, 3 each semester. Prerequisites, Physics 151, 162 and 164 or equivalent; Math. 29 and 30.

Mr. ROSS.

195, 196. ELECTRONICS.—Two class hours; one 2-hour laboratory period. Prerequisites, Physics 151, 152; Math. 29 and 30. Credit, 3 each semester.

Mr. POWERS.

Pomology

ARTHUR P. FRENCH, major adviser

All students majoring in this department are required to offer a thesis as part of their major requirements.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

201, 202. POMOLOGICAL RESEARCH.—A critical review of past and current research work in the field of pomology. Topics selected according to the interests and needs of the individual student. Credit, 2 each semester.

Prerequisite, Pomology 181 and 182. Mr. SOUTHWICK and the STAFF.

205. ADVANCED SYSTEMATIC POMOLOGY.—An intensive study of leaf and tree characters of nursery and orchard trees with reference to identification and the relationship of varieties. This work to be undertaken in the summer. Credit, 3.

Prerequisite, Pomology 175. Mr. FRENCH.

Horticulture 211, 212. SEMINAR.—Each student will present papers on assigned topics in Horticulture. Departments of Pomology, Floriculture and Olericulture cooperating. Required of all graduate students majoring in Floriculture, Olericulture, and Pomology. Credit, 1 each semester.

THE DEPARTMENTS.

300. THESIS, MASTER'S DEGREE. Each student majoring in Pomology will be required to carry out an original investigation on an approved problem and present the results thereof in satisfactory form as a thesis. Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

181, 182. ADVANCED POMOLOGY.—A consideration of the scientific principles governing the growth and behavior of fruit-bearing plants.

Prerequisite, Pomology 53. Credit, 3 each semester.

Mr. FRENCH, Mr. SOUTHWICK and Mr. WEEKS.

Plant Breeding

Plant Breeding 152. ADVANCED PLANT BREEDING.—An advanced study of genetic topics peculiar to plants together with consideration of the methods and problems of the plant breeder. Credit, 3.

Prerequisite, Zoology 153 or equivalent. Mr. FRENCH.

Plant Breeding 181. PLANT CYTOLOGICAL TECHNIQUES.—The methods of cytology useful to the plant geneticist. Credit, 2.

Mr. FRENCH.

Plant Breeding 182. **SPECIAL PROBLEMS IN PLANT BREEDING.**—Advanced study of special topics in the field of plant genetics and breeding. Credit, 2.
Prerequisite, Plant Breeding 152. Mr. FRENCH.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agronomy 263. **CHEMISTRY OF THE SOIL.** Credit, 3 each semester.
Mr. STECKEL.

Agronomy 264. **EXPERIMENTAL METHODS.** Credit, 3.
Mr. YEGIAN.

COURSES FOR MINOR CREDIT ONLY

156. **SPRAYING.** Credit, 3.
Mr. O. ANDERSON.

175. **SYSTEMATIC POMOLOGY.** Credit, 4.
Mr. O. ANDERSON.

177. **COMMERCIAL POMOLOGY.** Credit, 3.
Mr. ROBERTS.

183, 184.—**SEMINAR.** Credit, 1 each semester.
THE STAFF.

Poultry Science

FRED P. JEFFREY, major adviser.

The Master of Science degree is offered in the field of genetics and physiology.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. **SPECIAL PROBLEMS.**—Research problems in avian genetics and physiology. Problems such as heat tolerance, metabolism of chicks, factors affecting feathering have been carried out in the past and are mentioned here to illustrate the type of problem that might be undertaken. Credit, 3.

Mr. HAYS, Mr. SMYTH, or Mr. JEFFREY.

202. **POULTRY RESEARCH PROBLEMS.**—A critical review of research in genetics or physiology. Required is a comprehensive written report covering some particular phase of the science from its beginning to the present. The final report requires that the student evaluate work in the field and suggest new and unexplored areas. Credit, 3.

Mr. HAYS, Mr. SMITH, or Mr. JEFFREY.

Prerequisites are standard undergraduate courses in poultry husbandry.

203. **ADVANCED GENETICS.**—A lecture course dealing with the experimental study of genetics in plants and animals. The major aspects of the science are discussed and illustrated to give the student a good working knowledge and to stimulate his interest in this field of biology. Credit, 3.

3 class hours. Mr. HAYS.

Prerequisites, at least one year's training in biology and Zoology 153 or its equivalent.

204. **ADVANCED GENETICS.**—A continuation of Poultry 203. The first third of the semester will be devoted to human genetics and the last two-thirds to the application of the latest statistical methods in the interpretation of biological data.

Credit, 3.

3 class hours.

Mr. HAYS.

205. **AVIAN GENETICS.**—A lecture course covering the genetics of the principal domesticated birds. Special attention is given to methods of experimentation and interpretation of genetic data.

Credit, 3.

Mr. SMYTH.

Prerequisites, at least one year's training in biology and Zoology 153 or its equivalent.

206. **AVIAN GENETICS AND PHYSIOLOGY.**—This course is a continuation of Poultry 205. Special emphasis will be put on the fields of physiological and population genetics as they apply to poultry genetics and breeding. The physiology of reproduction of avian species will also be considered in detail.

3 class hours.

Credit, 3.

Prerequisite, Poultry 205.

Mr. SMYTH.

300. **THESIS, MASTER'S DEGREE.**

Credit, 10.

COURSE FOR MINOR CREDIT ONLY

201. **ADVANCED POULTRY HUSBANDRY.**—A critical review of research in any one of these fields: (a) genetics and physiology, (b) nutrition, (c) marketing, or (d) incubation and brooding. Three written reports and a comprehensive final examination are required. This course is designed for teachers of vocational agriculture.

Credit, 3.

THE STAFF.

Prerequisites are standard undergraduate courses in poultry husbandry.

Psychology

CLAUDE C. NEET, major adviser.

The student majoring in Psychology may orient his program toward either a terminal Master's degree or toward general preparation for doctorate study in Psychology elsewhere. Emphasis may be in the areas of general experimental psychology, personality and social psychology, or in the applied fields of clinical, industrial and vocational tests and measurements.

Students applying for admission on full status should, in addition to meeting the requirements of the Graduate School, have taken the Introductory course and 21 undergraduate credits in Psychology including a course in experimental psychology and a course in statistics. In case the student has not taken this number of credits or lacks these courses, he may be allowed to make up the deficiencies in the Undergraduate School of the University. In exceptional cases students with entrance deficiencies may, at the end of one semester's study, petition the Department to waive remaining undergraduate deficiencies. In completing his application, the student should arrange to take the Miller Analogies Test, Form H, and have his score submitted.

All students qualifying for the Master of Science degree in Psychology must in addition to meeting the degree requirements of the Graduate School, pass a written examination which will cover certain general fields of Psychology selected by the Department and certain special fields which may be chosen by the candidate. Students electing Psychology 200 (Problem in Psychology), or 300 (Thesis) for the Master's degree must take a final oral examination given by the Department covering their problem or thesis.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. PROBLEM IN PSYCHOLOGY.—A research project which may be taken in lieu of the thesis.

Credit, 4-6.

THE STAFF.

201. NEURAL CORRELATES.—A detailed study of the neuroanatomical relationships of sensory-motor systems. Emphasis is placed upon the major fiber systems and their role in behavior. Given in alternate years, beginning 1954-55. Prerequisites, 6 hours Psychology and 6 hours Zoology or the equivalent.

Credit, 2.

Mr. FELDMAN.

204. LEARNING.—A consideration of basic laws of learning, and of their implications for explaining complex behaviors.

Prerequisite, Psychology 51.

Credit, 2.

Mr. Goss.

205. DISCRIMINAL PROCESSES.—An analysis of sensory and perceptual processes. The relationships among physical, physiological and psychological variables are stressed. Given in alternate years, beginning 1953-54.

Credit, 3.

Prerequisites, 6 hours Psychology and 6 hours Zoology or the equivalent.

Mr. FELDMAN.

214. THEORY AND CONSTRUCTION OF PSYCHOLOGICAL TESTS.—A study of methods, concepts, and statistical procedures employed in constructing and evaluating psychological measuring devices.

Credit, 2.

Prerequisite, Psychology 175.

Mr. SPECTOR.

222. THEORIES OF PERSONALITY.—Several theories of the nature, development and functions of the normal personality are critically reviewed. The following general theories and their variants will be studied: psychoanalysis, personalism, phenomenology, factor theory, and behaviorism. Given in alternate years, beginning 1952-53.

Credit, 2.

Prerequisites, Psychology 161 or 183, or 194.

Mr. MAUSNER.

223. ADVANCED SOCIAL PSYCHOLOGY.—Several special topics in Social Psychology are selected for intensive study through the literature and experimentation. Among the topics considered are: attitude measurement, propaganda, rumor, and socialization of motives.

Credit, 2.

Prerequisite, Psychology 161 or 162.

Mr. MAUSNER.

225. ADVANCED ABNORMAL PSYCHOLOGY.—An intensive study of the behavior disorders and their relationships to normal behavior. Major emphasis is on theories of etiology and symptom formation, and on general problems of therapy.

Prerequisite, Psychology 183.

Credit, 3.

Mr. NEET.

246. PSYCHOLOGY OF THE PRE-SCHOOL CHILD.—A detailed study of the behavior of the child from the early prenatal period to the school age.

Prerequisite, Psychology 194.

Credit, 2.

Mr. NEET.

265. PROJECTIVE TECHNIQUES.—A survey of the history, theory, and development of the projective method in personality investigation. Techniques to be studied include the Rorschach, Thematic Apperception, Sentence Completion, Picture-Frustration, Szondi, and others.

Credit, 3.

Prerequisites, Psychology 181 and 183.

Mr. SAUNDERS.

268. **CLINICAL PRACTICUM.**—Supervised practice in the diagnostic and therapeutic procedures used by the psychologist in a clinical setting. Students electing this course will take their practicum training in the Northampton State Hospital, the Clarke School for the Deaf, or in the University Guidance and Counseling Services. Credit, 3.

Prerequisites, Psychology 182, 183 and 265, or the consent of the instructor.

Mr. SAUNDERS.

300. **THESIS, MASTER'S DEGREE.**—Students planning eventually to study for the doctorate in Psychology are advised to elect this course. Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

156. **EDUCATIONAL PSYCHOLOGY.**—A study of psychological facts and principles fundamental to education, teaching, and personal relationships between teacher and pupil. Topics considered in relation to school situations are: Physical and mental growth, intelligence, motivation, emotions, learning, transfer of training, and mental hygiene of teacher and pupil. Credit, 3.

Prerequisite, Psychology 26.

Mr. MAUSNER.

161. **SOCIAL PSYCHOLOGY.**—The social behavior of the individual. Topics considered will include methods of studying social behavior, "schools" of social psychology, social behavior of animals, foundations of personality development, social (cultural) determinants of personality, social attitudes and their measurement, effects of collective situations on individual behavior, customs and conformity. Credit, 3.

Prerequisite, Psychology 26.

Mr. MAUSNER.

162. **SOCIAL PSYCHOLOGY.**—A survey of multiindividual phenomena. Topics to be considered are methods of studying collective action, leadership, morale, propaganda, nature and measurement of public opinion, behavior in crowd situations, social conflict and prejudice. Given in alternate years, beginning 1951-52. Prerequisite, Psychology 161 or the consent of the instructor. Credit, 3.

Mr. MAUSNER.

163. **PHYSIOLOGICAL PSYCHOLOGY.**—A study of the relationships between the individual's behavior and his physiological processes. Emphasis will be placed on sensory and motor phenomena, drives, emotional behavior, and learning.

Credit, 3.

Prerequisite, 6 units of Psychology; Zoology 35.

Mr. FELDMAN.

172. **ADVANCED EXPERIMENTAL PSYCHOLOGY.**—Experimental design, techniques, and apparatus in psychology are considered, and selected projects are carried out individually by the members of the class. Credit, 3.

Prerequisite, Psychology 51.

Mr. NEET.

175. **PSYCHOLOGICAL STATISTICS.**—The application of statistical procedures to the analysis of psychological data and to problems of measurement in psychology and related fields. Credit, 3.

Prerequisite, One semester of statistics, or the equivalent.

Mr. GOSS.

181. **PSYCHOLOGICAL TESTS, GENERAL.**—A survey of the construction, development, and use of a variety of psychological tests. Emphasis will be placed upon

the administration, scoring, interpretation and evaluation of tests of personality, interests, aptitudes, and group tests of intelligence. Credit, 3.

Prerequisite, Psychology 26.

Mr. SAUNDERS.

182. **PSYCHOLOGICAL TESTS, INDIVIDUAL INTELLIGENCE TESTS.**—Theories as to the nature and measurement of intelligence. Emphasis is on the administration, scoring and interpretation of individual intelligence tests such as the Stanford-Binet, Wechsler-Bellevue, Merrill-Palmer, and others. Credit, 3.

Prerequisite, Psychology 181.

Mr. SAUNDERS.

183. **ABNORMAL PSYCHOLOGY.**—A study of abnormal behavior. Attention is given to the following: dynamics of behavior abnormalities, the neuroses, psychoses, mental deficiency, speech problems, and sensory and motor disorders. Credit, 3.

Prerequisite, Psychology 26.

Mr. NEET.

186. **INDUSTRIAL PSYCHOLOGY.**—The course aims to give understanding of psychological principles and methods in business and industrial situations. Topics considered include: employee selection and training, motivation and morale, working conditions, fatigue and accident prevention. Credit, 3.

Prerequisite, Psychology 26.

Mr. SPECTOR.

188. **PSYCHOLOGY OF GUIDANCE.**—A study of the psychological principles, techniques and tests necessary in guidance. Practice is given in organizing and evaluating relevant data in the analysis of illustrative cases. Credit, 3.

Prerequisite, Psychology 181.

Mr. FIELD.

190. **CONTEMPORARY PSYCHOLOGIES.**—An introductory historical, logical and systematic analysis of contemporary psychological theories. Credit, 3.

Prerequisite, Psychology 26.

Mr. GOSS.

192. **CLINICAL PSYCHOLOGY.**—A study of the development, and present status of the techniques and methods used by the psychologist in the diagnosis and treatment of behavior disorders. Consideration is given to the use of diagnostic tests, psycho-therapy, and the general role of the clinical psychologist.

Prerequisite, Psychology 184.

Credit, 3.

Mr. SAUNDERS.

193. **ADOLESCENT PSYCHOLOGY.**—The application of the basic principles of learning, primary and secondary motivation, frustration and conflict to the facts and problems of adolescent behavior. Given in alternate years, beginning 1952-53. Credit, 3.

Prerequisite, Psychology 26.

Mr. GOSS.

194. **CHILD PSYCHOLOGY.**—The course aims to develop an understanding of the behavior of the child. Psychological aspects of the following are considered: Original nature, maturation, play, social behavior, personality and mental hygiene. Nursery school observation and practice. Credit, 3.

Prerequisite, Psychology 26.

Mr. NEET.

Public Health

RALPH L. FRANCE, major adviser.

Environmental sanitation: Through the cooperation of the Massachusetts Department of Public Health, provision has been made to offer the following courses, on a graduate level, for a limited number of students interested in environmental sanitation, and who intend to prepare for positions as sanitarians with Federal, State or local health agencies. In addition to the University requirements for admission, applicants as undergraduates must have majored

in the field of chemistry and biology or submit acceptable evidence of equivalent experience as a full-time employee of official or voluntary health agencies.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL PROBLEMS IN PUBLIC HEALTH.—Special investigational or research problems in public health for advanced students. The scope of this work can be varied to meet specific conditions. Credit, 3-6.

THE STAFF.

201. PUBLIC HEALTH LAW.—A discussion of the laws governing health activities of federal, state and local health agencies including methods of preparation and mediation of health legislation and regulations. Rules of evidence and conduct of witnesses will be included. Credit, 3.

Mr. ROBERTSON.

202. METHODS OF PUBLIC HEALTH EDUCATION.—The object of this course is to give the health educator an opportunity to study, use, and evaluate some of the special methods, tools, and skills in health education. Opportunity for practice in the preparation of health education materials is provided. Credit, 3.

Mr. ROBERTSON.

203. THE PLANNING OF ENVIRONMENTAL SANITATION PROGRAMS.—The practical techniques of putting the principles of environmental sanitation into practice in a health department program are studied. The level of application and the field of application will be determined by the students' own needs. Topics considered are the development of standards, rating systems and field forms, the uses and execution of sanitary surveys, the training of sub-professional sanitarians in areas outside the United States, the planning of schools in food handling, the use of milk-shed rating systems, the job analysis of a balanced sanitation program. Credit, 3.

THE STAFF.

205. SUPERVISED FIELD TRAINING. To be taken during the summer session. All graduates majoring in sanitary technology must complete a prescribed eight-week field training program conducted by the New England Field Training Center under the direction of the Training Division of the Communicable Disease Center, U. S. Public Health Service, with the assistance of the staff and State Department of Health personnel. This course is a prerequisite for placement in federal, state and municipal agencies. Credit, 6.

THE STAFF.

206. ADVANCED EPIDEMIOLOGY.—Lectures, discussions, and laboratory work on the principles, and methods of epidemiological investigation with laboratory work in assembling and analyzing crude data resulting from field investigations of epidemics. Credit, 3.

Prerequisite, P. H. 188 or equivalent.

Mr. LEE.

207. SEMINAR.—Lectures and reports on current literature and special topics. (One each semester.) Credit, 1-2.

THE STAFF.

300. THESIS, MASTER'S DEGREE.—Independent research leading to the preparation of a thesis that will make an original contribution to the literature in public health. Results should be suitable for publication. The thesis is optional for M.S. candidates who have had sufficient training in public health before entering the graduate school to profit more from thesis research than from additional courses. Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

161, 162. GENERAL AND COMMUNITY SANITATION.—A study of the problems of general and community sanitation. Subjects discussed will include insect and rodent control, housing and slum clearance, ventilation, lighting, bathing places, sanitation of eating utensils, nuisances, camp sanitation, industrial hygiene, water supplies, sewerage and sewage, refuse and garbage, food and milk sanitation.

Credit, 3.

Mr. PERRIELLO or Mr. ROBERTSON.

163. INDUSTRIAL HYGIENE AND SANITATION.

Credit, 3.

Permission of instructor.

Mr. PERRIELLO.

164. MICROSCOPY OF WATER.—Counting and control of plankton in potable waters.

Credit, 3.

Prerequisite, Bact. 31A.

Mr. SNOW.

184. PUBLIC HEALTH ADMINISTRATION.

Credit, 3.

Mr. PERRIELLO.

186. FIELD STUDIES IN SANITATION.—Trips will be taken into the field for the observation of public health practices.

Credit, 2.

Prerequisites, Public Health 161, 162.

Mr. ROBERTSON.

188. EPIDEMIOLOGY AND COMMUNICABLE DISEASE CONTROL.—Admission by approval of the instructor.

Credit, 3.

Mr. LEE.

190. SEMINAR.—Lectures and reports on current literature and special topics. (One each semester.)

Credit, 1.

Mr. PERRIELLO.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN.

Bacteriology 181. GENERAL APPLIED BACTERIOLOGY.

Credit, 4.

Mr. FRANCE.

Bacteriology 182. FOOD BACTERIOLOGY.

Credit, 3.

Miss GARVEY.

Bacteriology 190. SANITARY BACTERIOLOGY.

Credit, 3.

Mr. FRANCE.

Agricultural Economics 179. PRINCIPLES AND METHODS OF STATISTICS.

Credit, 3.

Mr. RUSSELL.

Botany 166. GENERAL MYCOLOGY.

Credit, 3.

Mr. BANFIELD.

Home Economics 203. ADVANCED NUTRITION—METABOLISM OF THE MAJOR FOODSTUFFS.

Credit, 3.

Miss MITCHELL.

Home Economics 204. ADVANCED NUTRITION—MINERALS AND VITAMINS.

Credit, 3.

Miss MITCHELL.

Food Technology 175. FOOD PRESERVATION.	Credit, 3. Mr. NEBESKY.
Food Technology 192. ANALYSIS OF FOOD PRODUCTS.	Credit, 3. Mr. FELLERS and Mr. NEBESKY.
Dairy 152. MARKET MILK.	Credit, 4. Mr. LINDQUIST.
Dairy 209, 210. SEMINAR.	Credit, 1 each semester. Mr. HANKINSON.

COURSES FOR MINOR CREDIT ONLY

With the assistance of a faculty adviser a minimum of six semester courses must be selected from the following which are offered by cooperating departments within the University or by the professional staff of the Massachusetts Department of Public Health. This program, when approved by the Department and the Dean of the Graduate School, will fulfill the student's minor requirements.

Government 162. ADMINISTRATIVE LAW.
 Entomology 174. MEDICAL ENTOMOLOGY.
 Forestry 151. FOREST MANAGEMENT OF WATERSHEDS.
 Animal Husbandry 153. ELEMENTS OF MEAT PACKING.
 Chemistry 163. WATER AND SEWAGE CHEMISTRY.
 Civil Engineering 179. WATER SUPPLY.
 Agricultural Engineering 180. FOOD PROCESS ENGINEERING.
 Education 166. PREPARATION AND USE OF AUDIO-VISUAL AIDS.

Romance Languages

CHARLES F. FRAKER, major adviser.

Requirements for admission to candidacy for the M.A. in Romance Languages:

1. A working knowledge of Latin.
2. Oral proficiency in at least one of the Romance Languages.
3. A reading knowledge of a second language (Latin, German or another Romance Language).

All candidates for the M.A. degree are required to take either Romance Languages 201-202, or 203-204.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. PROBLEM COURSE.—Independent study of some phase of linguistics or literature.
 Credit, 3 each semester; maximum credit, 6.
 THE STAFF.

201, 202. AN INTRODUCTION TO ROMANCE PHILOLOGY.—Studies in the laws of vowel and consonantal change; the provenience of words.
 Credit, 3 each semester.
 Mr. FRAKER.

203, 204. OLD FRENCH READINGS.—Early monuments of French Literature; The Arthurian and Carolingian Cycles. Given as needed.
 Credit, 3 each semester.
 Mr. GODING and Mr. FRAKER.

205, 206. OLD SPANISH READINGS.—Early monuments of Spanish Literature; The *Cronicas* and the *Poema del mio Cid*. Given as needed.

Credit, 3 each semester.

Mr. FRAKER.

300. THESIS, MASTER'S DEGREE.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

151, 152. FRENCH LITERATURE OF THE EIGHTEENTH CENTURY.—Given in alternate years, beginning 1952-53.

Credit, 3 each semester.

Mr. FRAKER.

153, 154. CONTEMPORARY FRENCH LITERATURE.—Given as needed.

Credit, 3 each semester.

Miss CLARKE.

155, 156. FRENCH CLASSICISM.—A survey of the Classic period, with readings from representative works. Given in alternate years, beginning 1951-52. Prerequisites, French 15 and 16 or their equivalent.

Credit, 3.

Mr. FRAKER.

157. FRENCH ROMANTICISM.—A detailed study of the Romantic Period. Readings from Hugo, de Vigny, Lamartine, de Musset, and others. Conducted in French. Given in alternate years, beginning 1952-53.

Credit, 3.

Prerequisites, French 15 and 16 or their equivalent.

Mr. GODING.

158. FRENCH REALISM.—A detailed study of the Realistic period and the modern writers. Readings from Balzac, Flaubert, Stendhal, Loti, Daudet, Anatole France, and others. Conducted in French. Given in alternate years, beginning 1951-52.

Credit, 3.

Prerequisite, French 31.

Mr. GODING.

180. ADVANCED GRAMMAR AND COMPOSITION.—A thorough review of grammar, pronunciation, and the phonetic method. A course for prospective teachers.

Credit, 3.

Mr. GODING.

181. SPANISH ROMANTICISM.—Readings from representative authors; written and oral composition. Given in alternate years, beginning 1952-53.

Credit, 3.

Prerequisite, a reading knowledge of Spanish.

Mr. FRAKER.

182. THE MODERNISTS.—Dario, Nervo, and their contemporaries; composition and conversation. Given in alternate years, beginning 1951-52.

Credit, 3.

Prerequisite, a reading knowledge of Spanish.

Mr. FRAKER.

183, 184. THE GOLDEN AGE.—Readings from Cervantes, Lope de Vega, Calderon, Garcilaso, and others. Composition and conversation. Given in alternate years, beginning 1951-52.

Credit, 3 each semester.

Prerequisites, Spanish 7 and 8.

Mr. FRAKER.

Sociology

COURSES FOR MINOR CREDIT ONLY

151. **URBAN SOCIOLOGY.**—A comparative study of modern social conditions, and methods of adjustment, with special reference to city environment. Characteristics of the population, urban ecology, and problems of adjustment in the fields of housing, health, education, and recreation.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. MANFREDI.

152. **RURAL SOCIOLOGY.**—A study of rural society from the standpoint of its population, institutions, standards of living, and their relation to urban society. 1953-54.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. KORSON.

153. **AN INTRODUCTORY STUDY OF CULTURAL ANTHROPOLOGY.**—A non-technical sociological study of man in pre-literate societies.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. LINDSTROM.

154. **AMERICAN RACE RELATIONS.**—The social, economic, and political aspects of racial problems in the United States, with particular reference to the Negro and major ethnic groups. A rabbi, minister, and priest are invited to address the class, and visits are made to the respective churches.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. KORSON.

157. **THE FAMILY.**—The history and development of the customs of courtship and marriage from primitive society to the American family. The basic causes of changes and trends of the family are considered. The folkways and mores of marriage in other contemporary societies are also studied.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. KORSON.

161. **POPULATION PROBLEMS.**—An analytical study of population trends and problems of the world; the origin, composition, growth, migration, and urbanization of the American population. A consideration of population pressure as a cause of migratory movements.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. LINDSTROM.

168. **INDUSTRIAL SOCIOLOGY.**—A study of the role, function and status of the worker in the industrial community. A consideration of the change in technology, and the resulting social change and adjustments made in the industrial community.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. KORSON.

175. **SOCIAL PROBLEMS.**—A study of abuses affecting the home, recreation, business, industry, family, welfare, public health, government, mental disease, and crime. The charitable and correctional institutions of Massachusetts as agencies of reform. Visits to Belchertown State Schools, Northampton State Hospital and Northampton Superior Court are arranged, and specialists in their fields will be invited as speakers.

3 class hours.

Prerequisite, Sociology 28.

Credit, 3.

Mr. DRIVER.

176. **INTRODUCTION TO SOCIAL WELFARE.**—Contemporary problems of social concern; causes of poverty; methods of caring for adult and child dependents and defectives. A consideration of public and private agency administration and techniques, and an examination of federal, state, and local community programs.

3 class hours.

Credit, 3.

Prerequisites, Sociology 28, 75.

Mr. DRIVER.

178. **CRIMINOLOGY.**—A study of the nature of crimes and the factors underlying criminal behavior. Attention is also given to the machinery of justice in criminal behavior; the law, the courts, police enforcement, penal and correctional institutions.

3 class hours.

Credit, 3.

Prerequisites, Sociology 28, 75.

Mr. DRIVER.

179, 180. **SEMINAR.**—Admission by permission of instructor. A study of the methods of research employed by sociologists. Students, under direction of the instructor, analyze and organize such sociological material as they gather through their own research. Projects must be approved in advance by the instructor.

Credit, 3.

Mr. DRIVER.

182. **SOCIOLOGICAL THEORY.**—An examination of the contributions of European and American writers who have concerned themselves with theories of the origin, growth, and development of human social organization.

3 class hours.

Mr. MANFREDI.

Prerequisite, Sociology 28.

Veterinary Science

COURSES FOR MINOR CREDIT ONLY

175. **COMPARATIVE VETERINARY ANATOMY.**

Credit, 3.

Mr. SMITH.

176. **GENERAL VETERINARY PATHOLOGY.**

Credit, 3.

Mr. SMITH.

178. **GENERAL VETERINARY PATHOLOGY.**

Credit, 3.

Mr. SMITH.

188. **AVIAN PATHOLOGY.**

Credit, 3.

Mr. SMITH.

Wildlife Management

REUBEN E. TRIPPENSEE, major adviser.

Graduate work in Wildlife Management is closely tied in with the Cooperative Wildlife Research Station which is now a part of the Department of Forestry and Wildlife Management. Financial support for the Unit is received from the U. S. Fish and Wildlife Service, the Wildlife Management Institute and the State Fish and Game Department. Dr. William G. Sheldon, director of the Research Unit spends approximately half of his time assisting the research activities of the students who work under fellowships received through the Unit. The director of research is automatically on the graduate committee of each student who receives funds through the Unit.

Students graduating in Wildlife Management at the University of Massachusetts are strongly urged to pursue graduate work at another University. Opportunities for fellowships in this field are usually available at other Cooperative Units.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL PROBLEMS IN WILDLIFE MANAGEMENT. Credit, 3 per semester
maximum credit 6

THE STAFF.

201. NORTH AMERICAN ANIMALS.—A review of the taxonomy, life histories and ecological inter-relationships of certain North American vertebrates.

Credit, 3.

Mr. TRIPPENSEE.

202. WILDLIFE ADMINISTRATION.—A study of the organization and operation of state and federal agencies and certain associations concerned with wildlife management.

Credit, 3.

Prerequisite, Wildlife Management 27 or equivalent. Mr. TRIPPENSEE.

203. WILD ANIMAL ABUNDANCE.—A study of the factors which influence wild animal abundance.

Credit, 3.

Mr. TRIPPENSEE.

204. LAND USE AND WILDLIFE.—A study of wildlife populations on different ecological sites with special emphasis on the indirect influence of land use practices and natural vegetative succession.

Credit, 3.

Prerequisites, Agronomy 2, Botany 181, Forestry 55 and 56 or equivalents.

Mr. SHELDON and Mr. TRIPPENSEE.

205. MANAGEMENT OF WET LANDS AND WATER IN RELATION TO WILDLIFE.

Credit, 3.

Mr. SHELDON and Mr. TRIPPENSEE.

300. THESIS, MASTER'S DEGREE.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

170. GAME BIRDS AND MAMMALS.—Life histories, ecology methods of management.

Credit, 3.

Mr. TRIPPENSEE.

171. WATERFOWL MANAGEMENT.—Life histories and factors which affect abundance of waterfowl.

Credit, 3.

Mr. TRIPPENSEE.

173. PREDACEOUS BIRDS AND INJURIOUS RODENTS.—Life histories, ecology and control.

Credit, 3.

Mr. TRIPPENSEE.

174. TECHNIQUES IN WILDLIFE MANAGEMENT.—Includes analysis of cover, census methods, food habit studies, and determination of flock and herd age and sex composition of game animals.

Credit, 3.

Mr. TRIPPENSEE.

175. MANAGEMENT OF FURBEARERS.—Life histories and management of fur-bearers and nomenclature of the fur trade.

Credit, 3.

Mr. TRIPPENSEE.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Agricultural Economics 179. ELEMENTARY STATISTICS THROUGH SIMPLE CORRELATION.	
	Credit, 3. Mr. RUSSELL.
Botany 167, 168. INTRODUCTORY PLANT PHYSIOLOGY. Credit, 3 each semester.	
	Mr. KOZLOWSKI.
Botany 181. PLANT ECOLOGY.	
	Credit, 3. Mr. LIVINGSTON.
Entomology 212. GEOGRAPHICAL DISTRIBUTION.	
	Credit, 3. Mr. ALEXANDER.
Entomology 190. EVOLUTION.	
	Credit, 2. Mr. HANSON.
Entomology 179. ADVANCED ANIMAL ECOLOGY.	
	Credit, 3. Mr. SWEETMAN.
Education 166. PREPARATION AND USE OF AUDIO-VISUAL AIDS.	
	Credit, 2-3. Mr. WYMAN.
Poultry Science. 203, 204. ADVANCED GENETICS.	
	Credit, 3 each semester. Mr. HAYS.
Zoology 250. SPECIAL PROBLEMS.	
	Credit, 3-6. THE STAFF.
Zoology 171. COMPARATIVE VERTEBRATE ANATOMY.	
	Credit, 3.
Zoology 174. LIMNOLOGY.—A study of inland waters.	
	Credit, 4.
Zoology 183. COMPARATIVE PHYSIOLOGY.	
	Credit, 4. Mr. BISHOP.
Zoology 184. GENERAL CELLULAR PHYSIOLOGY.	
	Credit, 4. Mr. BISHOP.
Zoology 186. FISHERY BIOLOGY.	
	Credit, 3. Mr. ANDREWS
Zoology 187. ENDOCRINOLOGY.	
	Credit, 3. Mr. SNEDECOR.

Zoology

GILBERT L. WOODSIDE, major adviser.

Applicants for admission to do graduate work in Zoology are required to take the graduate record examination. Students may make arrangements for taking the examination by writing to: Educational Testing Service, Princeton, New Jersey. If the examination has not been taken before the student begins his graduate work, it must be taken during the student's first semester in Graduate School.

A thesis is required of all graduate students in the Department of Zoology who become candidates for the Master's degree.

Candidates who have fulfilled the requirements of the Graduate School and the Department of Zoology will be awarded the Master of Arts degree.

COURSES OPEN TO GRADUATE STUDENTS ONLY

(For either major or minor credit)

200. SPECIAL PROBLEMS.

Credit, 3 or 6.
THE STAFF.

202. PROBLEMS IN INVERTEBRATE ZOOLOGY.—Invertebrate fauna of local ponds, streams and bogs. Morphology, classification habits and life cycles of such groups as freshwater sponges, flatworms, bryozoans, annelids and crustaceans, with a survey of the important literature on each group. Several field trips. Term paper required. This course permits the student to become familiar with animals of each of the above groups, the study of which can barely be touched in courses 170 and 174.

Credit, 3.

Discussion period and two 3-hour laboratory periods.

Prerequisite, Zoology 25, 170 or 174.

Miss TRAVER.

204. PROBLEMS IN PARASITISM.—The course has two aims: first to acquaint the student with the morphology, classification and life histories of the principal groups of parasitic helminths, only a few of which can be studied in Zoology 169; and second, to provide opportunity for the practical application of such knowledge. Included, in addition to the study of the helminth groups, are: methods of preparation of helminths for study; instruction and practice in the use of such reference sources as Biological Abstracts; an individual problem involving the collection, preparation and identification of helminth parasites from some species of animal; and the preparation of a term report embodying these findings.

One class hour; two 3-hour laboratory periods.

Credit, 3.

Prerequisites, Zoology 169 or equivalent.

Miss TRAVER.

220. EXPERIMENTAL EMBRYOLOGY.—Lectures, seminar reports and laboratory work dealing with the chief factors in the mechanics and physiology of development; the germ cells; fertilization, establishment of the primary axis; embryonic induction, and differentiation. Given in alternate years, beginning 1952-53.

Prerequisites, Zoology 172 or equivalent.

Mr. WOODSIDE.

245. ADVANCED VERTEBRATE PHYSIOLOGY.—An opportunity for the student to gain experience in small animal surgery and in making standard experimental preparations. Suitable techniques for recording results will be employed, and the proper interpretation of the acquired data will be stressed.

Credit, 3.

One class hour; one 4-hour laboratory period.

Mr. SNEDECOR.

Prerequisites, Zoology 35 and 171, or equivalent.

248. PHYSIOLOGICAL GENETICS.—The nature of the gene and its action in the developmental and physiological processes of the organism.

Credit, 3.

Prerequisite, Zoology 153, or equivalent, and permission of instructor.

Mr. RAUCH.

255. DEPARTMENTAL SEMINAR.

Credit, 2.

THE STAFF.

260. PHYSIOLOGY SEMINAR.

Credit, 1 each semester.

Maximum credit, 3.

Mr. SWENSON.

263. BIOLOGY OF PROTOZOA.—An intensive survey of problems of morphology, physiology, systematics, ecology, and evolution of the Protozoa. The parasitic forms are considered only in so far as they illustrate the ecological and evolutionary trends in the various groups.

Credit, 3.

Two lectures and two 2-hour laboratories a week.

Mr. HONIGBERG.

Enrollment limited to 12 students.

Prerequisites: Zoology 1 and permission of the instructor.

300. THESIS, MASTER'S DEGREE.

Credit, 10.

COURSES OPEN TO BOTH GRADUATE AND UNDERGRADUATE STUDENTS

(For either major or minor credit)

169. **ANIMAL PARASITOLOGY.**—Representative protozoan and helminthic parasites of man and domestic animals are studied, with special reference to their morphology and life cycles. Emphasis is placed upon parasitism as a mode of life, on host-parasite relationship, on vectors, and other modes of transmission, and on methods of control of certain of the more important human parasites. Graduate students taking this course prepare a term paper on some phase of parasitism.

One class hour; two 2-hour laboratory periods.

Credit, 3.

Prerequisite, Zoology 1.

Miss TRAVER.

170. **ADVANCED INVERTEBRATE ZOOLOGY.**—A survey of the phyla of invertebrate animals, from evolutionary and phylogenetic aspects. Morphology, modes of nutrition and reproduction, interrelationships with other animals, and distribution in time and space are considered, as well as classification. For each phylum, representatives of the principal classes are studied. Marine, terrestrial and freshwater forms are included.

One class hour; two 3-hour laboratory periods.

Credit, 3.

Prerequisite, Zoology 25 or its equivalent.

Miss TRAVER.

173. **GENERAL CYTOLOGY.**—A consideration of the morphological features of cells in relation to their function. Lectures, seminar reports and individual laboratory work. Given in alternate years, beginning 1953-54.

Credit, 3.

Prerequisites, Zoology 150 and 51.

Mr. ROLLASON.

174. **LIMNOLOGY.**—The study of inland waters, emphasizing the geological, physical, chemical and biological aspects of this problem. Standard methods for making physical and chemical collections, tests and measurements are used by students on the numerous field trips. Biological material collected in the field is studied in the laboratory. Five departments—Geology, Public Health, Botany, Entomology and Zoology are cooperating in the presentation of this course. Given in alternate years, beginning 1953-54.

Two class hours; two 3-hour laboratory periods.

Credit, 4.

Miss TRAVER, Mr. ALEXANDER, Mr. WILSON, Mr. ANDREWS, Mr. BARTLETT.

Mr. HANSON, Mr. NUTTING, Mr. PUTALA, Miss SMITH, Mr. SNOW.

Prerequisites: Botany 1, Zoology 1, Chemistry 1 and 2, and permission to register.

182. **MAMMOLOGY.**—The paleontology, taxonomy, speciation, natural history, range and distribution of the class Mammalia. Primary emphasis will be placed upon the study of local fauna, including at least one week-end collecting trip as part of the laboratory exercises.

Course limited to fifteen students. Given in alternate years, beginning 1953-54.

Credit, 3.

Two class hours; one 2-hour laboratory period.

Mr. DEARDEN.

183. **COMPARATIVE PHYSIOLOGY.**—The physiological principles and adaptations to the environment of animals throughout the invertebrate and vertebrate phyla.

Credit, 4.

Two class hours; two 3-hour laboratory periods.

Mr. ROBERTS.

Prerequisites, Zoology 1 and 35.

184. **GENERAL CELLULAR PHYSIOLOGY.**—Properties and processes common to all organisms, including protoplasmic organization, permeability, metabolism, movement, and bioelectricity.

Credit, 4.

Two class hours; two 3-hour laboratory periods.

Mr. SWENSON.

Prerequisites, one year biology; organic chemistry.

186. FISHERY BIOLOGY.—Theory in the practice of regulating fresh-water fisheries; the physical and biological conditions of the environment and their influence on fish populations. Credit, 3.

Prerequisite, Zoology 181 and permission of the instructor. Mr. ANDREWS.

187. ENDOCRINOLOGY.—The importance of the endocrines in their control over normal functions (growth, metabolism, reproduction, etc.) in a variety of animals. Credit, 3.

Two class hours; one 3-hour laboratory period. Mr. SNEDECOR.

COURSES IN OTHER DEPARTMENTS FOR WHICH MAJOR CREDIT WILL BE GIVEN

Chemistry 193-194. BIOCHEMISTRY. Credit, 5 each semester.

Mr. LITTLE.

Entomology 212. GEOGRAPHICAL DISTRIBUTION.—Geographic distribution of animals and plants, with particular reference to insects, insect migrations.

Credit, 2.

Mr. ALEXANDER.

COURSES FOR MINOR CREDIT ONLY

150. HISTOLOGY OF VERTEBRATES. Credit, 3.

Mr. ROLLASON.

153. GENETICS. Credit, 3.

Mr. RAUCH.

171. COMPARATIVE VERTEBRATE ANATOMY. Credit, 4.

Mr. BARTLETT and Mr. DEARDEN.

172. VERTEBRATE EMBRYOLOGY. Credit, 4.

Mr. WOODSIDE and Mr. RAUCH.

180. ORNITHOLOGY. Credit, 3.

Mr. BARTLETT and Mr. NUTTING.

181. VERTEBRATE ZOOLOGY. Credit, 3.

Mr. ANDREWS and Mr. BARTLETT.

185. THE CLASSES OF ARTHROPODS OTHER THAN INSECTS. Credit, 3.

Mr. HANSON

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THE UNIVERSITY OF MASSACHUSETTS

BULLETIN



Annual Undergraduate Catalogue

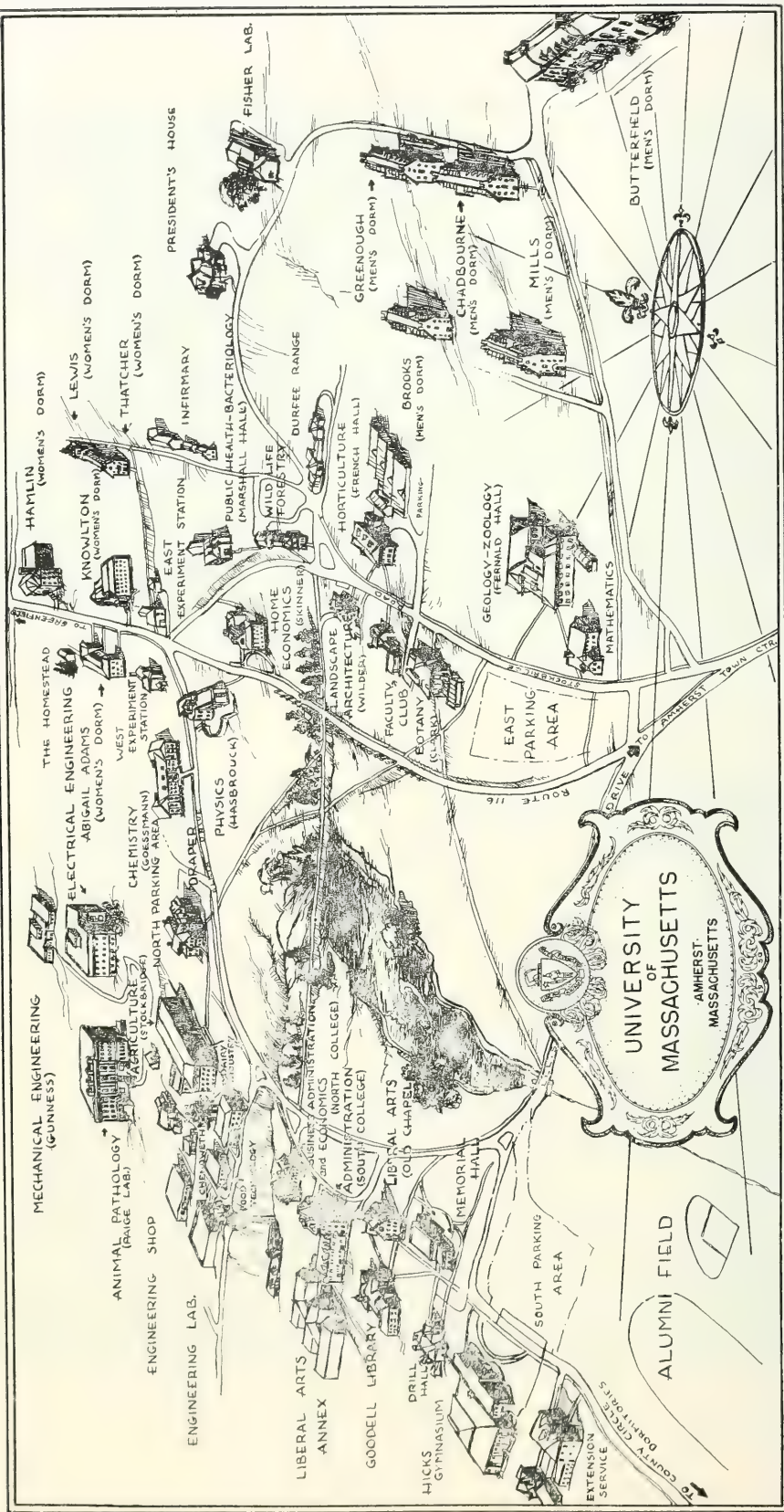
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SCHOOLS - 1953-54



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MAP OF STATE UNIVERSITY CAMPUS NEAR GEOGRAPHIC CENTER OF MASSACHUSETTS

Bulletin
**UNIVERSITY
OF
MASSACHUSETTS**

**CATALOGUE OF THE UNIVERSITY
1953-1954**



AMHERST, MASSACHUSETTS

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FOREWORD

This Catalogue of the University presents announcements concerning courses, admission, etc., for the sessions of 1953-1954.

The University reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

The University Catalogue for the sessions 1953-1954 is part of the Eighty-Ninth Annual Report of the University of Massachusetts and as such is part II of Public Document 31. Sec. 8, Chapter 75, of the General Laws of Massachusetts,)

UNIVERSITY OF MASSACHUSETTS

UNDERGRADUATE CALENDAR

1953

February 9, Monday, 8:00 A.M. Second semester begins.

February 23, Monday. Observance of Washington's Birthday.
No University exercises.

March 28, Saturday, 12:00 Noon to April 6, Monday. Spring recess.

April 20, Monday. Observance of Patriot's Day. No University exercises.

May 23, Saturday, 12:00 Noon. Classes stop.

May 25, Monday to June 4, Thursday, 5:00 P.M. Final examinations.

May 30, Saturday. Memorial Day. No University exercises.

June 5, Friday to June 7, Sunday. Commencement.

1953-1954

September 18-22, Friday through Tuesday. Freshman Orientation.

September 21, Monday. Registration of sophomore, junior, senior and graduate students.

September 22, Tuesday. Registration of Freshmen students.

September 23, Wednesday, 8:00 A. M. Classes begin for all students.

September 24, Thursday, 10:45 A. M. First University Convocation.

October 12, Monday. Columbus Day. No University exercises.

November 11, Wednesday. Armistice Day. No University exercises.

November 25, Wednesday, 12:00 Noon to November 30, Monday, 8:00 A.M. Holiday recess.

December 19, Saturday, 12:00 Noon to January 4, Monday, 8:00 A.M. Holiday recess.

January 4, Monday, 8:00 A.M. Classes resume.

January 21, Thursday, 5:00 P.M. Classes stop.

January 22, Friday. Registration of sophomore, junior, senior and graduate students.

January 23, Saturday. Registration of freshman students.

January 25, Monday to February 3, Wednesday. Final examinations.

February 8, Monday, 8:00 A.M. Second semester begins.

February 22, Monday. Washington's Birthday. No University exercises.

March 20, Saturday, 12:00 Noon to March 29, Monday. Spring recess.

April 15, Thursday, 5:00 P.M. to April 20, Tuesday, 8:00 A.M. Holiday recess.

May 22, Saturday, 12:00 Noon. Classes stop.

May 24, Monday to June 3, Thursday, 5:00 P.M. Final examinations.

May 31, Monday. Observance of Memorial Day. No University exercises.

June 4, Friday to June 6, Sunday. Commencement.

1954-1955

September 17-21, Friday through Tuesday. Freshman Orientation.

September 20, Monday. Registration of sophomore, junior, senior and graduate students.

September 21, Tuesday. Registration of freshman students.

September 22, Wednesday, 8:00 A.M. Classes begin for all students.

September 23, Thursday, 10:45 A.M. First University Convocation.

October 12, Tuesday. Columbus Day. No University exercises.

November 11, Thursday. Armistice Day. No University exercises.

November 24, Wednesday, 12:00 Noon to November 29, Monday, 8:00 A.M. Holiday recess.

December 18, Saturday, 12:00 Noon to January 3, Monday, 8:00 A.M. Holiday recess.

January 3, Monday, 8:00 A.M. Classes resume.

January 20, Thursday, 5:00 P.M. Classes stop.

January 21, Friday. Registration of sophomore, junior, senior and graduate students.

January 22, Saturday. Registration of freshman students.

January 24, Monday to February 2, Wednesday. Final examinations.

February 7, Monday, 8:00 A.M. Second semester begins.

February 22, Tuesday. Washington's Birthday. No University exercises.

April 2, Saturday, 12:00 Noon to April 11, Monday, 8:00 A.M. Spring recess.

April 19, Tuesday. Patriot's Day. No University exercises.

May 21, Saturday, 12:00 Noon. Classes stop.

May 23, Monday to June 2, Thursday, 5:00 P.M. Final examinations.

May 30, Monday, Memorial Day. No University exercises.

June 3, Friday to June 5, Sunday. Commencement.

BOARD OF TRUSTEES

January, 1953

HARRY DUNLAP BROWN, B.S. (University of Massachusetts), Billerica	1954
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- JOHN NELSON EVERSON, B.S., M.S. (University of Massachusetts), *Assistant Professor of Agronomy*. Stockbridge Hall
- THOMAS HOWARD FARR, B.A. (Western Michigan College of Education), M.S. (Michigan State College), *Instructor in Entomology*. Fernald Hall
- ROBERT SIMION FELDMAN, B.S., M.S., PH.D. (University of Michigan), *Associate Professor of Psychology*. Liberal Arts Annex
- ENIO FELICIOTTI, B.A., M.A. (Boston University), *Instructor in Food Technology*. Chenoweth Laboratory
- ¹ On leave of absence.

- CARL RAYMOND FELLERS, A.B. (Cornell University), M.S.,
PH.D. (Rutgers University), *Professor of Food Techno-
logy and Head of Department.* Chenoweth Laboratory
- TSUAN HUA FENG, B.S. IN C.E. (National Pei-Yang University),
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of Civil Engineering.* Gunness Laboratory
- JAMES M. FERRIGNO, A.B., A.M., PH.D. (Boston University),
Assistant Professor of Romance Languages. Liberal Arts Annex
- ²VERNON LEROY FERWERDA, B.A., M.S. (University of Massa-
chusetts), *Assistant Professor of Government.*
- MRS. BERTHA ELEANOR FESSENDEN, B.S. (Simmons College),
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- RICHARD WILLIAM FESSENDEN, B.S., M.S. (University of Mas-
sachusetts), PH.D. (Columbia University), *Professor of
Inorganic Chemistry.* Goessmann Laboratory
- ²GORDON FIELD, B.S., M.S. (University of Massachusetts), *In-
structor in Entomology.*
- EUGENE JOSEPH FINNEGAN, B.S., M.S. (University of Massa-
chusetts), *Instructor in Dairy Industry.* Flint Laboratory
- ROY MARSHALL FISHER, A.B. (Clark University), *Assistant
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- ²WILLIAM HENRY FITZPATRICK, B.S., M.S., PH.D. (University
of Massachusetts), *Instructor in Food Technology.*
- ALDIS ELWOOD FLINT, *Technical Assistant in Bacteriology.*
Marshall Hall Annex
- RICHARD CAROL FOLEY, B.S., M.S. (University of Massachu-
setts), PH.D. (Rutgers University), *Professor of Animal
Husbandry.* Stockbridge Hall
- CHARLES FREDERIC FRAKER, A.B. (Colorado College), A.M.,
PH.D. (Harvard University), *Professor of Romance Lan-
guages and Head of Department.* Liberal Arts Annex
- RALPH LYLE FRANCE, B.S. (University of Delaware), M.S.
(University of Massachusetts), *Professor of Bacteriology
and Acting Head of Department.* Marshall Hall Annex
- ARTHUR PERKINS FRENCH, B.S. (Ohio State University), M.S.
(University of Massachusetts), PH.D. (University of Min-
nesota), *Professor of Pomology and Plant Breeding and
Head of Department of Pomology.* French Hall
- JOSEPH GABRYS, B.S. (University of Moscow), C.E. (University
of Lithuania), D.ENG. (University of Latvia), *Instructor
in Civil Engineering.* Stockbridge Hall

² On leave of absence for military service.

- PAUL ADELARD GAGNON, A.B. (University of Massachusetts),
M.A. (Harvard University), C.E.P. (Universite de Paris),
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- PHILIP LYLE GAMBLE, B.S., M.A. (Wesleyan University), PH.D.
(Cornell University), *Professor of Economics and Head*
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- ROBERT VERRILL GANLEY, B.S. (University of Massachusetts),
M.F. (Duke University), *Instructor in Forestry.*
Conservation Building
- MARY ELLEN MONICA GARVEY, B.S. (University of Massachu-
setts), *Associate Professor of Bacteriology.*
Marshall Hall Annex
- GEORGE WOODROW GAUMOND, B.S. (University of Massachu-
setts), Captain, USAF, *Assistant Professor of Air Science*
and Tactics. Drill Hall
- CHESTER STEPHEN GLADCHUK, B.S.ED. (Boston College), *Assis-
tant Football Coach.* Physical Education Building
- HARRY NEWTON GLICK, A.B. (Bridgewater College), A.M.
(Northwestern University), PH.D. (University of Illinois),
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North College
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(Harvard University), PH.D. (University of Wisconsin),
Professor of French. Liberal Arts Annex
- MAXWELL HENRY GOLDBERG, B.S. (University of Massachu-
setts), M.A., PH.D. (Yale University), *Professor of English.*
Chapel
- ULRICH KARL GOLDSMITH, B.A., M.A. (University of Toronto),
PH.D. (University of California), *Associate Professor of*
German. Liberal Arts Annex
- GEORGE GOODWIN, JR., B.A. (Williams College), M.A. (Harvard
University), *Assistant Professor of Government.*
North College
- HAROLD MARTIN GORE, B.S. (University of Massachusetts),
Professor of Physical Education and Head of Department
of Physical Education for Men.
Physical Education Building
- ALBERT EDWARD GOSS, B.A., M.A., PH.D. (State University of
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Liberal Arts Annex
- JACK ERWIN GRAPENTINE, B.A. (Mount Union College), Major,
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Drill Hall
- SUMNER MELVIN GREENFIELD, A.B. (Boston College), A.M.
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- WILLIAM M. GRIMSHAW, B.S., M.ED. (Springfield College), M.A. (Columbia University), ED.D. (New York University),
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- THOMAS AUGUSTUS GROW, B.S. (University of Connecticut),
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- HERBERT WILLIAM HAAS, B.S. IN C.E. (University of Wisconsin),
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- ²NATHAN STRONG HALE, B.S. (University of Connecticut), M.S. (University of Minnesota), *Associate Professor of Animal Husbandry.*
- EDWARD DUNCAN HALL, B.S. (University of Massachusetts),
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- WILLIAM HALLER, JR., A.B. (Amherst College), M.A., PH.D. (Columbia University), *Assistant Professor of Economics.* North College
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- TOM SHERMAN HAMILTON, JR., B.F.A. IN LAND.ARCH. (University of Illinois), *Instructor in Landscape Architecture.* Wilder Hall
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- DENZEL J. HANKINSON, B.S. (Michigan State College), M.S. (University of Connecticut), PH.D. (Pennsylvania State College), *Professor of Dairy Industry and Head of Department.* Flint Laboratory
- JOHN FRANCIS HANSON, B.S., M.S., PH.D. (University of Massachusetts), *Assistant Professor of Insect Morphology.* Fernald Hall
- HAROLD ERNEST HARDY, A.B. (Pomona College), PH.D. (University of Minnesota), *Professor of Marketing.* North College
- RICHARD HAVEN, B.A. (Harvard University), M.A. (Princeton University), *Instructor in English.* Chapel
- SARAH LOUISE HAWES, B.S. (Northern Michigan College of Education), M.S. (Cornell University), *Instructor in Home Economics.* Edna Skinner Hall
- WILLIAM KARR HEFNER, B.A. (Antioch College), C.P.A., *Instructor in Business Administration.* North College
- VERNON PARKER HELMING, B.A. (Carleton College), PH.D. (Yale University), *Professor of English.* Chapel
- KARL NEWCOMB HENDRICKSON, B.S., M.S. (University of Maine), *Associate Professor of Civil Engineering.* Mechanics Laboratory

¹ On leave of absence.

² On Sabbatical leave.

- MRS. MARCIA GRAHAM HIBBARD, B.S. (Russell Sage College),
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cation for Women.* Drill Hall
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Gunness Laboratory
- MRS. FLORIANA TARANTINO HOGAN, B.S., A.M. (Boston Uni-
versity), *Instructor in English.* Chapel
- ROBERT POWELL HOLDSWORTH, B.S. (Michigan State College),
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of Department.* Conservation Building
- BRONISLAW MARK HONIGBERG, A.B., M.A., PH.D. (University of
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- ¹LEONTA GERTRUDE HARRIGAN, B.S. (University of Massachu-
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- SAMUEL CHURCH HUBBARD, *Assistant Professor of Floriculture.*
French Hall
- ANGELO IANTOSCA, S.B. (Massachusetts Institute of Techno-
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- WILLIAM LEONARD IVES, B.S. (University of Massachusetts),
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- FRED PAINTER JEFFREY, B.S. (Pennsylvania State College),
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Husbandry and Head of Department.* Stockbridge Hall
- WARREN IRVING JOHANSSON, B.S., M.S. (University of Massa-
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Fernald Hall
- ROBERT BROWN JOHNSON, A.B. (Ohio University), M.A., PH.D.
(University of Wisconsin), *Assistant Professor of Ro-
mance Languages.* Liberal Arts Annex
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- SIDNEY KAPLAN, B.A. (College of the City of New York),
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Chapel

¹ On leave of absence.

- SIDNEY WILLIAM KAUFFMAN, B.S., M.ED. (Springfield College),
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- CARL ANTON KEYSER, B.S. (Carnegie Institute of Technology),
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Professor of Metallurgy. Engineering Wing
- AHMAD ALI KHEIRALLA, B.S. (Massachusetts Institute of Tech-
 nology), M.S. (Stanford University), *Instructor in Mathe-*
matics. Mathematics Building
- MILO KIMBALL, B.S. (Ohio Northern University), B.B.A., M.B.A.
 Boston University), *Dean of the School of Business Ad-*
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- CLARENCE WENDELL KING, B.A., M.A., PH. D. (Yale University),
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- GORDON STEPHENSON KING, B.S. (Michigan State College),
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 ers College), *Assistant Professor of Mechanical Engineer-*
ing.
- ROBERT PHILIPS LANE, A.B. (Columbia University), M.A.
 (Harvard University), *Assistant Professor of English.* Chapel
- JOSEPH WALTON LANGFORD, JR., B.S. (University of New
 Hampshire), S.M. (Massachusetts Institute of Techno-
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- MARSHALL OLIN LANPHEAR, B.S., M.S. (University of Massa-
 chusetts), *Registrar.* South College
- EDWARD PETER LARKIN, B.S., M.S. (University of Massachu-
 setts), *Instructor in Public Health.* Marshall Hall Annex
- ¹ On leave of absence.

HENRY ARTHUR LEA, B.S. IN ED., M.A. (University of Pennsylvania), *Instructor in German*. Liberal Arts Annex

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Physical Education Building

² On leave of absence for military service.

JAMES BUREN LUDTKE, B.A., M.A., PH.D. (State University of Iowa), *Assistant Professor of Business Finance.*

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Liberal Arts Annex

WILLIAM PRESTON MACCONNELL, B.S. (University of Massachusetts), M.F. (Yale University), *Instructor in Forestry.*

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WILLIAM IRVING MATTHEWS, LL.B., M.A. (Columbia University), *Instructor in Government.*

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- HELEN SWIFT MITCHELL, A.B. (Mt. Holyoke College), PH.D.
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- BRUCE ROBERT MORRIS, A.B. (Western Reserve University),
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- DONALD EUGENE MOSER, A.B. (Amherst College), A.M. (Brown
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- ARTHUR BENSON MUSGRAVE, B.S., M.S. (Boston University),
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- PASQUALE C. NATALE, Captain, USA, *Assistant Professor of*
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 Stockbridge Hall
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¹ On leave of absence.

² On leave of absence for military service.

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- EUGENE CHARLES PUTALA, B.S., M.S. (University of Massachusetts), *Instructor in Botany.* Clark Hall
- FRANK PRENTICE RAND, A.B. (Williams College), A.M. (Amherst College), *Professor of English and Head of Department; Acting Dean of School of Liberal Arts.* Chapel
- HAROLD RAUCH, B.S. (Queens College), M.S. (University of Illinois), PH.D. (Brown University), *Assistant Professor of Zoology.* Fernald Hall
- ARNOLD DENSMORE RHODES, B.S. (University of New Hampshire), M.F. (Yale University), *Professor of Forestry.* Conservation Building
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- WALTER STUNTZ RITCHIE, B.S. (Ohio State College), A.M., PH.D. (University of Missouri), *Goessmann Professor of Chemistry and Head of Department; Acting Dean of School Science.* Goessmann Laboratory
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ALEXANDER A. ROBERTSON, *Assistant Professor of Bacteriology*. Marshall Hall

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WILLIAM WINSTON SAUNDERS, B.A. (University of Oklahoma), *Instructor in Psychology*. Liberal Arts Annex

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¹ On leave of absence.

³ On Sabbatical leave for first semester.

⁴ On Sabbatical leave.

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- STANLEY VANCE, B.A. (St. Charles College), M.A., PH.D. (University of Pennsylvania), *Associate Professor of Industrial Administration.* North College
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Heads of those departments functioning in the Experiment Station, although not listed here, are also recognized as members of the staff.

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² On leave of absence for military service.

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Paige Laboratory
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Animal Disease Control. Paige Laboratory
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Elected faculty members:

Term expires 1953: CARY, ROYS, L. R. WILSON.

Term expires 1954: DITTFACH, ELLERT, J. F. HANSON, HOLDSWORTH, SMART.

Term expires 1955: COLWELL, GORE, HANKINSON, PIATT.

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Chairman HELMING, CURTIS, FELDMAN, R. C. FOLEY, HOPKINS, J. H. SMITH, TOTMAN, VARLEY, and Student Representation.

SUMMER SESSION

Chairman GRIMSHAW, ELLERT, HOPKINS, H. S. MITCHELL, RITCHIE, WOODSIDE.

* Alumni representative

UNIVERSITY OF MASSACHUSETTS

The University of Massachusetts is the State Institution of the Commonwealth founded under the provisions of the Morrill Land Grant Act of Congress of 1862. This Act provided in each state for "the endowment for and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Massachusetts accepted the provisions of the Morrill Act in 1863 by founding a new college at Amherst to be known as "Massachusetts Agricultural College" and Chapter 75 of the General Laws of the Commonwealth states that "the leading object of the College shall be to teach subjects relating to agriculture and the mechanic arts so as to promote liberal and practical education. Its curriculum may include other scientific and classical studies and shall include military tactics."

The Trustees of Massachusetts Agricultural College were incorporated in 1863, and officers were appointed in that year. It was not until October 2, 1867, however, that the College was formally opened to students. At that time there were four teachers on the faculty and four wooden buildings on the campus. The enrollment steadily increased during the first term, however, and by December 1867, forty-seven students had been admitted. From this modest beginning the College has grown steadily, both in number of students and scope of its work. In April 1931, the name of the institution was changed by legislative enactment to Massachusetts State College. In 1939 the Trustees voted to award the A.B. degree as well as the B.S. which previously had been the undergraduate degree of the College. In May, 1947 the College became the University of Massachusetts.

FUNCTIONS OF THE UNIVERSITY

The University of Massachusetts now serves the Commonwealth in the three important fields of resident instruction, research, and extension. Since all three services are organized on the campus, students have the advantages that come from contact with persons carrying education to the state at large, with others conducting original investigation as well as those engaged in formal instruction.

RESIDENT INSTRUCTION

DEGREE COURSES

THE UNDERGRADUATE COLLEGE. The University offers four-year undergraduate instruction leading to the following degrees: Bachelor of Science, Bachelor of Arts, Bachelor of Science in Agricultural, Chemical, Civil, Electrical and Mechanical Engineering, Bachelor of Business Administration and Bachelor of Vocational Agriculture.

This instruction is assigned to the College of Arts and Sciences, the Schools of Agriculture and Horticulture, Business Administration, Engineering, Home Economics, and to the Division of Physical Education. The aim of the four-year course is to give as high a degree of proficiency in some particular branch of learning as is possible without sacrificing the breadth, knowledge, and training which should characterize a well-rounded college education.

The degree of Bachelor of Science is conferred upon those candidates who complete the curriculum requirements of the freshman and sophomore years, and 60 junior-senior credits including the specialization requirements in a particular biological or physical science department of the College of Arts and Sciences. The Bachelor of Sciences degree is awarded also to students who complete the curriculum requirements of the Schools of Agriculture and Horticulture, Home Economics, and the Division of Physical Education for men. This degree may also be granted to students majoring in Education or Psychology who complete a minimum of 15 junior-senior credits in science departments of the College.

The degree of Bachelor of Arts is awarded to all candidates who complete the curriculum requirements of the freshman and sophomore years in the College of Arts and Sciences and 60 junior-senior credits including the specialization requirements of a social science department in the College. This degree may be awarded also to majors in a biological or physical science department who select a minimum of 18 junior-senior credits in social-science departments of the College.

All graduates from the School of Engineering will receive the appropriate degrees of Bachelor of Science in Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering or Agricultural Engineering.

All graduates from the School of Business Administration will receive the degree of Bachelor of Business Administration.

Special arrangements are made for some graduates of county agricultural schools and of agricultural departments of certain high schools to complete the college course with majors in agriculture or horticulture. Upon the completion

of their course they will be granted a Bachelor of Vocational Agriculture degree.

GRADUATE SCHOOL

THE GRADUATE SCHOOL. Graduate courses leading to the Doctor of Philosophy degree may be taken in the following fields: Agronomy, Bacteriology, Botany, Chemistry, Economics, Entomology, Food Science, and Food Technology.

The following departments offer major work leading to a Master's degree: Agricultural Economics, Agronomy, Animal Husbandry, Bacteriology, Botany, Chemistry, Civil Engineering, Dairy Industry, Economics, Education, Electrical Engineering, English, Entomology, Floriculture, Food Technology, Geology and Mineralogy, History, Home Economics, Landscape Architecture, Mathematics, Mechanical Engineering, Olericulture, Philosophy, Physical Education for Men, Pomology, Poultry Science, Psychology, Public Health, Romance Languages, Wildlife Management, Zoology.

The degree of Master of Landscape Architecture is granted to students completing the two years' graduate work offered by the Department of Landscape Architecture; while students taking the equivalent of one year's graduate work in that major may be granted the degree of Bachelor of Landscape Architecture.

Several other departments in the University, while not regularly organized for major work in the Graduate School, do, nevertheless, offer courses which may be selected for minor credit. These are: Forestry, Physics, and Veterinary Science.

The general requirements of the Graduate School regarding admission, residence, credits, tuition, etc., together with specific information concerning details of interest to prospective students, are outlined in a separate bulletin, which may be obtained upon request from the Dean of the Graduate School.

SUMMER SCHOOL

THE SUMMER SCHOOL. A Summer Session is available for those desiring to accelerate their program. This Summer Session is planned to serve the needs of (1) all students enrolled as candidates for a degree at any college, (2) persons desiring refresher or professional improvement courses, (3) graduate students desirous of meeting specific requirements in certain fields, and (4) any adult person who finds courses suited to his preparation and needs. Applications for the Summer School may be obtained by writing to the Director of the Summer Session.

NON-DEGREE SHORT COURSES

The University, through its Short Course division, as a special service under the Land-Grant Act by which it was established, provides a complete program of two-year technical and vocational courses in the fields of agriculture and horticulture. These train for all types of commercial farming operations as practiced in New England.

Other short courses, varying in length from one to ten weeks, furnish supplementary training for city and town sanitary inspectors, tree wardens and city foresters, golf course greenkeepers, and skilled workers in dairy and ice cream plants.

THE STOCKBRIDGE SCHOOL OF AGRICULTURE. This School was organized at the University in 1918 under the name of "The Two Year Course in Practical Agriculture." Its purpose was to meet the demand for shorter courses in agriculture which might be taken by high school graduates who could not satisfy college entrance requirements or who, for one reason or another, were unable to take the four year college course. In 1928 the School was given its present name in honor of Levi Stockbridge, first professor of agriculture at the University and its fifth president.

This program trains men and women primarily for the practice of farming or associated agricultural industries. Graduation from the School does not fulfill the requirements for entrance into the degree course, nor are credits earned during the course regularly transferable toward credit for a degree. A diploma is awarded for satisfactory completion of any two-year course; for other short courses certificates are presented.

As the two-year program is now organized a student may choose any one of eleven vocational courses including dairy farming, dairy manufactures or milk plant operation; poultry farming, arboriculture or the care of trees; fine turf maintenance for golf courses, cemeteries, park, and play-grounds; commercial flower growing, both retail and wholesale; food management for clubs, hotels, and restaurants; commercial fruit farming, ornamental horticulture or landscape gardening; commercial vegetable farming, and applied forestry for timber growing and forest products industries.

On-the-job placement training is required of all first year students in the second semester for a period of four to seven months, depending on type of employment. No student can earn a diploma of graduation without this applied training experience. Wages earned can pay a large part of second year expenses if the student is forced to economize.

Limited enrollment quotas in each major course make necessary early filing of application. No formal entrance examinations are required for non-degree short courses.

A catalog, giving complete description of all two-year courses offered in The Stockbridge School of Agriculture, as well as full details on estimated costs, employment opportunities in each field, and entrance arrangements is available. Application form is printed in the catalog. Write to Director of Short Courses, University of Massachusetts, Amherst, Massachusetts.

NOTE: (For interview or personal conference the Short Course Office is open Monday through Friday from 8:30 to 12:00 and 1:00 to 5:00, state and national holidays excepted.)

RESEARCH AND REGULATORY SERVICES

The University of Massachusetts serves the fields of agriculture and horticulture through its Experiment Station, which provides research and regulatory services. Experiment stations were established in all states as the need of development of practical information on subjects relating to agriculture became apparent. Through the efforts of experiment stations a fund of scientific knowledge applicable to agriculture and horticulture has been accumulated, and research workers in the experiment stations continue to contribute to this knowledge by constant research and experimentation.

At the University of Massachusetts, the Experiment Station service has expanded until it now deals with problems in the following fields of specialization: Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Bacteriology, Botany, Chemistry, Dairy Industry, Economics, Engineering, Entomology, Horticulture, Floriculture, Food Technology, Nutrition, Olericulture, Pomology, Poultry Science, and Veterinary Science. Most of the research activities of the University of Massachusetts are undertaken at the main Experiment Station at Amherst. There are, however, two substations, one at Waltham, devoted largely to the problems of horticulture as applied to olericulture, floriculture, and nursery culture, and one at East Wareham, where attempts are in progress to solve the problems of the cranberry and blueberry growers.

In addition to the work described above, the administration of certain regulatory services, as pertaining to the sale of feeds, fertilizers, and seeds and to the use of dairy glassware, is also assigned to the Experiment Station which is equipped with the necessary laboratory facilities and personnel for that purpose.

EXTENSION SERVICE

The Massachusetts Extension Service is a cooperative teaching effort between the United States Department of Agriculture, the University of Massachusetts and the several counties of the State. The work of the Extension Service is carried on through unified teaching programs in all parts of

Massachusetts. The Extension Service assists the people of the farm, the home, and the rural communities to improve agriculture, home making, and rural life. The University of Massachusetts is the State Extension Service headquarters. Extension educational teaching plans are made in council with the people who determine their problems and help to suggest methods and practices for their solution.

The Extension effort was brought about by the Smith-Lever Law, passed by Congress on May 8, 1914. Since that time, the service has grown to a staff of over 100 State and County workers who conduct an educational program in all phases of agriculture and home-making among the adults and young people (4-H Club work) of the State. All types of methods, including subject matter, meetings, demonstrations, farm and home visits, publications, visual aid, and radio are used in carrying out this educational program directly in the farm and rural areas of the State. During the war emergency, the Extension Service extended its home food production and preservation program to the urban areas.

THE UNIVERSITY CAMPUS

The University of Massachusetts is located near the geographical center of the State at Amherst. This town of about 7,000 overlooks one of the most picturesque sections of the Connecticut River Valley. The valley is noted both for its scenic beauty and its educational institutions. The setting for the University, therefore, is ideal. The surrounding county is a rich agricultural region providing an excellent outdoor laboratory for the work in Agriculture and Horticulture as well as for the Biological Sciences and Geology. Those interested in other Sciences and Liberal Arts study under equally favorable conditions both because of the facilities at the University and its location in this educational area of the valley.

Amherst is eighty-seven miles from Boston and may be reached by bus connections from Northampton, Greenfield, Springfield, and Worcester. The campus consists of a tract of approximately seven hundred acres, lying about a mile north of the village center. In addition, the University owns one area of 755 acres six miles north of the campus on Mt. Toby and has recently been given another tract of 2000 acres of readily accessible forest land on Mt. Lincoln several miles to the east of the campus. These holdings are administered by the Department of Forestry and are used in instruction as demonstration forests.

The University also operates a horticultural field station at Waltham and a cranberry field station at East Wareham.

BUILDINGS AND EQUIPMENT

The campus is laid out in the form of an oval attractively set off by the College Pond in the center. Around this oval are grouped the main buildings of the University. Those

using the attached map of the campus are advised to start at South College, the Administration Building, and proceed in the order indicated below.

SOUTH COLLEGE.—Here are located the administrative offices including those of the President, Dean, Registrar, Treasurer, Secretary, Director of Placement Service, the Dean of Women, and the Dean of Men. Erected 1885.

NORTH COLLEGE.—The University Store, offices and classrooms of the School of Business Administration and the Department of Economics. Erected 1868.

FARLEY 4-H CLUB BUILDING AND BOWDITCH LODGE.—Headquarters for 4-H Club Activities. Erected 1933 and 1936 respectively by funds contributed by 4-H Club members and interested friends and organizations. The former was named to honor George L. Farley for twenty-five years State Leader of County Club Agents; the latter for Nathaniel Bowditch, Trustee of the University from 1896-1945.

POWER PLANT—General Maintenance.

UNIVERSITY FARM.—In the University barns are maintained Percheron and Morgan horses; Aberdeen-Angus, Ayrshire, Guernsey, Hereford, Jersey and Holstein cattle; Shropshire and South-down sheep; and Chester White swine. The university farm is operated as a livestock farm, producing all its necessary roughage in the form of pastures, hay and silage and a portion of its required grain.

LIBERAL ARTS BUILDING.—Classrooms, laboratories and offices for Foreign Languages, Psychology and Education. Erected 1947.

GRINNELL ARENA AND ABATTOIR.—Erected in 1910 primarily for livestock judging. An abattoir was constructed in 1930 as an addition to the original building. Named in honor of James S. Grinnell, for twenty-two years a trustee of the University.

FLINT LABORATORY.—Laboratories and classrooms for Dairy Industry. Erected in 1911 and named for Charles L. Flint, fourth president of the University.

STOCKBRIDGE HALL.—Departments of Agricultural Economics and Farm Management, Agronomy, Animal Husbandry and Poultry Husbandry. Erected in 1914 and named for Levi Stockbridge, first Professor of Agriculture and a former President of the University. Bowker Auditorium, the main auditorium of the University, is located here. It is named for William H. Bowker, a member of the first graduating class, trustee of the University, and one of the pioneers in the fertilizer industry.

CHENOWETH LABORATORY.—Classrooms and laboratories including Commercial Practices Laboratory for the Department of Food Technology. Erected 1929 and named in honor

of Walter W. Chenoweth, pioneer in the field of Food Technology and first Head of the Department.

DRAMATIC WORKSHOP.—A headquarters for instruction in stagecraft.

HATCH LABORATORY.—A laboratory where small animals and chickens are used in connection with investigations into human, animal, and poultry nutrition.

ENGINEERING ANNEX.—Laboratories, classrooms, and offices for the School of Engineering. Erected 1948.

ENGINEERING SHOP.—Laboratories and shop for machine tools, woodworking, motors, and welding instruction. Erected 1916.

POULTRY PLANT.—Consisting of a number of modern buildings in which instruction and research in ventilation, breeding, feeding, incubation, brooding, marketing and management of poultry and poultry enterprises take place. Rhode Island Reds, Barred Plymouth Rocks, White Plymouth Rocks, New Hampshires, and S.C. White Leghorns and several other breeds are maintained here on a commercial basis.

DRAPER HALL.—University Dining Hall. Erected 1903 with an addition in 1912. Named in honor of James Draper, for twenty years a trustee of the University. Annex erected 1947.

PAIGE LABORATORY.—Erected in 1950 and named in honor of James B. Paige, a graduate of the College in 1882 and Professor of Veterinary Science from 1891-1922. The building contains classrooms and laboratories. Laboratories for State Control and research work in animal diseases are located here.

GUNNESS LABORATORY.—Laboratories for industrial combustion engines, materials testing, fluid mechanics, heating, air conditioning and refrigeration, electrical machinery, electrical circuits, as well as classrooms and offices for the School of Engineering. Built in 1948 and named in honor of Christian I. Gunness, Professor of Agricultural Engineering from 1914 to 1946.

ELECTRICAL ENGINEERING WING.—Completed in 1950, this portion of the proposed main Engineering building provides laboratories for Industrial Electronics, Communications, Ultra High Frequency, Electrical Measurements, Illumination and Metallurgy, as well as classrooms and offices for the School of Engineering. This structure is planned as a wing for the future main Engineering building of the University.

GOESSMANN LABORATORY.—Contains eight large laboratories, an auditorium, chemical library, and lecture rooms. The east wing of the third floor is used by the Experiment Station chemists. The remainder of the building is for resident instruction in Chemistry. Erected in 1924 and named in honor

of Charles A. Goessmann, first Professor of Chemistry at the University.

WEST EXPERIMENT STATION.—The State Control Service is centralized here. Fertilizers, seeds, and feeds are analyzed or inspected in accordance with the state law. Erected 1886.

EAST EXPERIMENT STATION.—Here are located the offices of the Director of the Experiment Station and Graduate School and other administrative officials.

ABIGAIL ADAMS HOUSE.—Women's dormitory accomodating 100 students. Erected in 1919 and named for Abigail Adams, wife of John Adams, second President of the United States.

THE HOMESTEAD.—Girls majoring in Home Economics receive their Home Management practice here. This is a fine old colonial homestead newly equipped with all the modern conveniences of the home.

HAMLIN HOUSE.—A self-liquidating dormitory housing 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1949. Named for Margaret P. Hamlin, first Placement Officer for Women from 1919 to 1948.

KNOWLTON HOUSE.—A self-liquidating dormitory with accommodations for 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1950. Named in honor of Helen Knowlton, Associate Professor of Home Economics, 1924-1941.

LEWIS HOUSE.—Women's dormitory accommodating 150 students. A self-liquidating dormitory erected under the sponsorship of the Associate Alumni in 1940 and named in honor of Edward M. Lewis, Dean of the College 1914-25 and President 1925-27.

NEW DORMITORIES.—Two new dormitories are under construction in this area. They are self-liquidating buildings, being constructed by the Alumni Building Association and will increase facilities for housing women students.

THATCHER HOUSE.—Women's dormitory with facilities for 150 students. Erected in 1935 and named in honor of Roscoe W. Thatcher, President of the College 1927-32.

UNIVERSITY DINING COMMONS.—A central University dining commons for men and women students which will be completed in 1953. Constructed by the Commonwealth to replace Draper Hall as a central dining facility.

UNIVERSITY INFIRMARY.—A group of three buildings, one for bed patients, one for out patients and a third for contagious cases.

MARSHALL HALL.—Erected in 1915 and named for Dr. Charles Marshall, a former Professor of Bacteriology and

Director of the Graduate School. The building provides laboratories and classroom space for the Department of Bacteriology and the Department of Zoology.

SKINNER HALL.—Laboratories, classrooms and offices for the School of Home Economics, Erected in 1947 and named in honor of Edna L. Skinner, first Dean of the School of Home Economics.

HASBROUCK PHYSICS LABORATORY.—Completed in 1949. Contains laboratories and lecture rooms designed for the various main divisions of Physics. Named in honor of Philip B. Hasbrouck, Professor of Physics and Registrar of the College during the period 1905 to 1924.

CONSERVATION BUILDING.—Formerly the Old Botany Museum, erected 1867. Houses laboratories, classrooms and offices for the Department of Forestry and Wildlife Management.

FISHER LABORATORY.—Erected in 1910 and named for Jabez Fisher, one of the foremost early horticulturists of the state. Laboratories for Pomology. Included are a quick freezing room, six refrigerator rooms, two rooms for the storage of frozen products, two classrooms, and three packing rooms.

WILD LIFE LABORATORY.—Laboratories for graduate students in Wild Life Management.

WILDER HALL.—Here are the classrooms, drafting rooms, and offices of the Department of Landscape Architecture. Erected in 1905 and named for Marshall P. Wilder, a pioneer in the movement for agricultural education in Massachusetts, and one of the first trustees of the College.

FRENCH HALL.—French Hall, built in 1908 and named in honor of Henry F. French, the first President of the College, houses the Departments of Floriculture, Pomology, and Olericulture. In the rear of the building is the new Durfee range of greenhouses, built in 1908 and devoted to the growing of carnations, roses, chrysanthemums, etc. One house is maintained as a conservatory and contains a collection of plants used primarily for decorative purposes. The old Durfee range just north of French includes a collection of tropical and semi-tropical plants of botanical and horticultural importance. It was erected in 1867 from money given by Dr. Nathan Durfee of Fall River, treasurer of the board of trustees.

STOCKBRIDGE HOUSE.—Faculty Club House.

SHADE TREE LABORATORIES.—Constructed in 1948 for research on shade tree problems including Dutch Elm Disease.

CLARK HALL.—Offices, lecture rooms, laboratories, and greenhouses of the Department of Botany are located here. The herbarium contains about 40,000 sheets of seed plants

and ferns, 2,500 sheets of liverworts and mosses, and a collection of 20,000 specimens of fungi. The building was erected in 1906 and named in honor of William S. Clark, President of the College and Professor of Botany from 1867 to 1879.

FERNALD HALL.—Erected in 1909 and named in honor of Professor Charles H. Fernald who served the College from 1886 to 1909, built up a strong Department of Zoology, created the Department of Entomology, and acted as Director of the Graduate School. Fernald Hall houses the Departments of Entomology and Geology and offices and classrooms of the Department of Zoology. Offices and laboratories of the Western Sanitary District, Massachusetts Department of Public Health, are also located here. The Entomology collection includes over 160,000 insects. There are also Geological and Zoological museums.

MATHEMATICS BUILDING.—Classrooms and offices of the Mathematics Department.

MILLS HOUSE.—A self-liquidating dormitory for 150 students. Erected in 1948 under the sponsorship of the Associate Alumni. Named in honor of George F. Mills, teacher of English from 1899 to 1914 and Head of the Division of Humanities.

BROOKS HOUSE.—Men's self-liquidating dormitory. Named in honor of William Penn Brooks, Professor of Agriculture and Director of the Experiment Station, 1888-1921.

BUTTERFIELD HOUSE.—A self-liquidating dormitory with dining hall. Accommodates 147 students. Erected in 1941 under the sponsorship of the Associate Alumni. Named in honor of Kenyon L. Butterfield, President of the College 1906-1924.

CHADBOURNE HOUSE.—Men's dormitory for one hundred and fifty students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of Paul Ansel Chadbourne, President 1866-67 and 1882-83.

BAKER HOUSE.—Men's dormitory accommodating 360 students. A self-liquidating dormitory erected 1951 by the Alumni Building Corporation. Named in honor of Hugh P. Baker, President of the University from 1933 to 1947.

GREENOUGH HOUSE.—Men's dormitory and Dining Hall. Houses one hundred and forty-eight students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of James Carruthers Greenough, President from 1883-86.

MUNSON HALL.—Headquarters for the Massachusetts Extension Service. Named in honor of Willard K. Munson, a graduate of the College in 1905 and Director of the Extension Service from 1926 to 1951.

CURRY S. HICKS PHYSICAL EDUCATION BUILDING.—Erected in 1931 from funds contributed by Alumni and friends of the College plus an appropriation by the state legislature. Contains a large swimming pool, an exercise hall, basketball floor, and locker room. Named for Curry S. Hicks, Professor and Head of the Division of Physical Education from 1911 to 1949.

ALUMNI FIELD.—So called because both funds and labor for its construction were contributed by alumni and students. Included are a baseball diamond, football and soccer fields, and a cinder track. Ten tennis courts are adjacent to the Physical Education Building.

ATHLETIC FIELD FOR WOMEN.—A large field west of the Physical Educational Building provides space for Archery, Softball, Field Hockey, and other women's activities.

COUNTY CIRCLE.—Five residence halls erected in 1948 by the Commonwealth. Hampshire and Suffolk Houses contain 30 two-room and three-room apartments for married persons and their families. Plymouth, Berkshire, and Middlesex Houses contain dormitory rooms for approximately 144 students each.

COLLEGE ARMORY.—Contains, in addition to the offices of the Department of Military Science, the offices, locker and dressing rooms, and exercise hall for the Department of Physical Education for Women.

MEMORIAL HALL.—Erected in 1921 by Alumni and friends in memory of those men of the College who died in World War I. Included is a Memorial Room in which the names of those members of the College family who died in the service of their country are appropriately enshrined. This building is a social center of student life. Alumni headquarters are here as well as the offices of student organizations including the Senate, Collegian, and Index. The Associate Alumni are, at the present time, in the process of raising a fund to add a large wing to this building. The purpose of the new wing is to commemorate the sacrifices made by our college men who gave their lives for their country in World War II.

OLD CHAPEL.—Erected in 1885. Auditorium, seminar room, classrooms, and offices for English, History and Sociology.

GOODELL LIBRARY.—Goodell Library is named in honor of Henry Hill Goodell who served the College from 1867-1905. He was President from 1886 to 1905 and because of his deep enthusiasm for books also acted as Librarian of the College.

Goodell Library is a virtually fireproof building erected in 1935. Its plan is unique in that the book-stacks are open freely for inspection and borrowing.

The main floor includes a large reading room, a reference room, delivery desk, cataloging and administrative offices. On the second floor is another large reading room, commonly used for reserve book reading. There are also studies for faculty and students and the University of Massachusetts Memorabilia room.

Besides Goodell Library there are fifty-two departmental libraries ranging from small collections to sizable separate libraries with reading rooms and valuable collections of reference and text books.

The complete library system contains 165,000 volumes and is growing at the rate of over 4,000 volumes a year. The library regularly receives over 600 periodicals, and also the serial publications of learned societies. It is also a depository for government documents of the United States Department of Agriculture and the various State Experiment Stations.

INFORMATION CONCERNING THE UNIVERSITY COURSE

The sections of the catalogue that follow are primarily for undergraduate students in the four year degree course. Those interested in graduate study are referred to the Graduate School catalogue and in short courses to the catalogue of the Stockbridge School of Agriculture and other short course publications.

STUDENT EXPENSES

Expenses vary from approximately \$750 to \$850 per year for the normally economical student. First year costs are usually greater than those of the other three years and there is less opportunity to earn. A student is advised to have a definite plan for meeting the expenses of the first year before entering.

Freshmen entering the School of Engineering should be prepared to meet an expense of approximately \$35 for drawing equipment and a slide rule.

The following estimate of a year's expenses, based upon last year's costs, includes only those items which are strictly college and does not include amounts for clothing, laundry, travel, etc. These costs vary slightly from year to year. Tuition for residents of Massachusetts is \$100 per year and for others \$400.

	Normal
Tuition (citizens of Massachusetts	\$100.00
Room in college dormitory or private home (ave.)	165.00
Board at University Dining Hall	430.00
Books, stationery, and other supplies	90.00
Athletic Fee	20.00
Student Tax (approx.)	18.50
	\$823.50

INITIAL PAYMENT FOR FRESHMEN

The initial payment required of freshmen at the time of fall registration is indicated below and is made up of the following items:

Tuition (citizens of Massachusetts)	\$50.00
Room rent (dormitory) approximately	82.50
Board (University Dining Hall)	165.00
Military Uniform (men students)	30.00
Athletic Fee	20.00
Student Tax (approx.)	10.00
Books, Stationery, etc.	45.00
	\$402.50

The above are only approximate figures. A bill will be rendered to the parent of each student prior to the opening of the University.

TUITION.—As a state institution the University of Massachusetts offers a low rate of tuition to all students entering from the Commonwealth. Eligibility for admission under the low residential rate is determined in accordance with the following policy established by the Board of Trustees.

A student must present evidence satisfactory to the Treasurer of the University that his domicile is in the Commonwealth of Massachusetts in order to be considered eligible to register in the University as a resident student. This means that he must have established a *bona fide* residence in the Commonwealth with the intention of continuing to maintain it as such.

The domicile of a minor shall follow that of the parents unless such minor has been emancipated. In case of emancipation the student, in addition to the requirements of these regulations respecting residence, shall present satisfactory proof respecting emancipation. Minors under guardianship shall be required to present, in addition to the certification of the domicile of the guardian, satisfactory documentary evidence of the appointment of the guardian.

No student shall be considered to have gained residence by reason of his attendance in the University nor shall a student lose residential preference during his continuous attendance at the University.

The residence of a wife shall follow that of the husband.

The prescribed form of application for classification as to residence status must be executed by each student. Misrepresentation of facts in order to evade the payment of out-of-state tuition shall be considered sufficient cause for suspension or permanent exclusion from the University.

Discretion to adjust individual cases within the spirit of these rules is lodged with the President of the University.

BOARD.—The University provides three dining halls for students at Butterfield House, Greenough House and Draper Hall. The dining halls at Butterfield and Greenough dormitories are intended primarily to provide for students housed in that area, including residents of Chadbourne, Mills and Brooks Houses.

All freshmen except commuters will be required to board at University dining halls on a five-day week basis.

Sophomores and juniors residing in University dormitories and other campus buildings will also be required to board at University Dining Halls except that such students who are members of fraternities or sororities may be permitted upon request to board at their respective fraternities or sororities.

Any student who wishes may board at University dining halls on the ticket plan or cash basis.

MILITARY UNIFORM.—All students taking military drill are required to make a deposit of \$30 for the uniform. A rebate of this amount is made when the uniform is returned.

STUDENT ACTIVITY TAX.—This tax, authorized by vote of the undergraduate students with the approval of the Board of Trustees, provides each student with the Collegian, the student newspaper; Index, University annual; Social Union privileges, student government, class and other activities.

ADVANCE PAYMENT

New students will be expected to make an advance payment of \$15 to the Treasurer of the University as soon as they are notified by the Registrar that they are accepted for admission. This will be considered as first payment on registration fee, which will be due at time of matriculation in September. It is not refundable and will be considered as payment for admissions and registration expense if the student does not matriculate.

A Certificate of Residence form furnished by the University must be properly filled out by the parent and the town or city clerk and returned with the \$15.00 advance payment.

WHEN PAYMENTS ARE DUE

In accordance with policy established by the Board of Trustees, all charges for tuition, fees, board, and room rent in University Dormitories are due and payable seven days prior to the date of registration of each semester. Bills will be rendered in advance and payment may best be made by mail. Students may not register until registration charges are paid .

LATE PAYMENT AND REGISTRATION

Any student who does not make payment of his semester charges within the time specified may be required to pay a fine of \$5.00. Similarly, any student who does not report for registration on the dates specified or fails to complete his registration within the prescribed time may be required to pay a late registration fee of \$5.00.

REFUNDS

Students will be granted refunds of payments made to the University in accordance with the following policy.

TUITION AND FEES

A student who leaves the University for any reason except as specified below before a semester is completed will be granted a refund of tuition and fees in accordance with the following schedule:

REGULAR TERM

- a. Within the first two weeks from the beginning of semester or term — 80 %
- b. During the third week — 60 %
- c. During the fourth week — 40 %
- d. During the fifth week — 20 %
- e. After the fifth week — no refund

SIX-WEEK SUMMER SESSION

- a. During the first week — 60 %
- b. During the second week — 20 %
- c. After the second week — no refund

A student who makes an advance payment and then for any reason does not attend any part of the next semester or term at the University will be given a full refund of tuition and fees. The \$15.00 advance payment fee required of new students is not refundable.

A student who is involuntarily called into military service before the completion of a semester will be given a pro rata refund of tuition and fees provided that he receives no academic credit for the work of that semester. If academic credit is given, there will be no refund.

ROOM RENT

It is the policy of the University that there will be no refund of prepaid room rent after the semester has commenced except in the case of a student who is involuntarily called to military service who will be granted a refund on a pro rata basis.

A student who has made an advanced payment of room rent who fails to attend any part of the next semester or term or does not reside in a dormitory or other housing will be granted a full refund of prepaid room rent.

BOARD

Prepaid board will be refunded on a pro rata basis.

A student who is expelled or suspended from the University for disciplinary reasons forfeits all rights to a refund.

VETERANS' INFORMATION

Veterans who are entering the University for the first time under the old G.I. Bill (P.L. 346) must present a Certificate of Eligibility at registration. This may be obtained from your nearest Veterans Administration office. Veterans failing to obtain the Certificate of Eligibility must make payment of tuition and fees in order to register. Board and room fees must be paid in advance whether enrolled under the G.I. Bill or not.

Veterans (under P.L. 346) who are transferring to the University of Massachusetts from another institution or who have done summer work at another institution will be required

to submit a supplemental Certificate of Eligibility at registration. This may be obtained by applying through the veterans' office at the institution last attended.

Veterans entering under the new G.I. Bill (P.L. 550) must meet all expenses personally. Presentation of a Certificate of Eligibility should insure the receipt of subsistence checks from the Veterans Administration.

FINANCIAL REQUIREMENTS FOR GRADUATION OR HONORABLE DISMISSAL

Diplomas, transcripts of record, and letters of honorable dismissal will be withheld from all students who have not paid all bills and all loans due the University or all legitimate bills for room rent and board due fraternities or private individuals. All such bills due the University must be paid ten days preceding Commencement. If paid after that date and the student is otherwise eligible, he may graduate the following year.

FINANCIAL AID

Scholarships, loans, and part-time employment are available for a limited number of needy and deserving students.

AID FOR FRESHMAN YEAR.—Freshmen are eligible for scholarships and part-time employment. A freshman also becomes eligible for assistance from loan funds after satisfactorily completing one semester of academic work. Scholarship application blanks may be secured from the Registrar and should be filed by May 1. Part-time employment application forms may be obtained from the Director of Placement Service and filed after a candidate has been accepted for admission.

Because of the time required for preparation of studies, few students should plan to spend more than ten hours per week in part-time employment.

AID FOR UPPERCLASSMEN.—To become eligible for financial assistance, whether scholarship, loan, or part-time employment students must file completed financial aid application forms with the Student Aid Committee in the Placement Service office by March 1 previous to the college year for which assistance is asked.

AID FOR GRADUATES OF THE UNIVERSITY.—The Lotta M. Crabtree Agricultural Funds make available to graduates of the University of Massachusetts funds to be used for farm financing.

The purpose of loans from these funds is to assist meritorious graduates who are without means in establishing themselves in agricultural pursuits. These loans are made without interest or service charges other than the cost of title search and legal papers. They must, however, be paid

back in full amount within a reasonable length of time and there are certain restrictions on their use.

Applications for the "Lotta Agricultural Fund" should be addressed to the Trustees of the Lotta M. Crabtree Estate, 619 Washington Street, Boston, Massachusetts, or may be secured at the Placement Office at the University. Decisions regarding the granting of a loan rest entirely with the Trustees under the terms of Miss Crabtree's will.

SCHOLARSHIPS

Scholarships are awarded only to needy and deserving students of high character whose habits of life are economical and whose scholastic records are satisfactory. A limited number of these scholarships are available for entering freshmen.

Scholarships are paid in installments at the beginning of each semester in the form of a credit on the student's bill. A scholarship may be discontinued at the close of any semester.

If the scholarship student withdraws from the University, any refund of University fees or charges must first be applied to reimburse the scholarship fund for the full amount of the scholarship received by the student for the semester.

The following scholarships are available:

ALVORD DAIRY SCHOLARSHIP.—for a worthy student specializing in the study of Dairy Husbandry with the intention of becoming an investigator, teacher or special practitioner in connection with the dairy industry.

DANFORTH KEYES BANGS SCHOLARSHIP.—for the aid of industrious and deserving students.

CHI OMEGA AWARD.—The local chapter of the Chi Omega Sorority offers an annual scholarship of twenty-five dollars to that woman student majoring in the department of economics or psychology who has the highest scholastic average at the end of the first semester of the senior year.

LUCIUS CLAPP FUND.—to provide scholarships and loans to deserving students.

THE COMMONWEALTH SCHOLARSHIP.—The Commonwealth of Massachusetts annually provides twenty-five scholarships of not more than two hundred and fifty dollars for members of each of the four undergraduate classes of the University. Upperclass students may obtain application forms at the University placement office. Entering freshmen may obtain application forms at the Registrar's Office.

CLASS OF 1882 SCHOLARSHIP.—for the aid of a worthy student of the junior or senior class.

FREDERICK G. CRANE SCHOLARSHIPS.—for the aid of worthy undergraduate students, preference being given to residents of Berkshire County.

J. D. W. FRENCH SCHOLARSHIPS.—for deserving students in dairying and allied subjects; also Forestry.

HENRY GASSETT SCHOLARSHIP.—for a worthy undergraduate student.

CHARLES A. GLEASON SCHOLARSHIPS.—general scholarship for worthy students.

CHARLES H. HOOD DAIRY SCHOLARSHIPS.—An unusual grant of \$800 for two scholarships to be awarded to seniors whose ultimate object is the operation of their own dairy farms.

LOTTA SCHOLARSHIPS.—The Trustees of the Lotta Crabtree Agricultural Fund have made available a substantial sum for scholarships. These are limited to students registered in the Schools of Agriculture, Home Economics, Horticulture and some Science departments. One-fourth of the amount granted is awarded to freshmen.

MARGARET F. MOTLEY SCHOLARSHIP.—one scholarship of \$100 for an upperclass student studying Horticulture, Landscape Architecture or Floriculture.

PORTER L. NEWTON SCHOLARSHIPS.—for the aid of worthy and deserving students in the field of agriculture.

BETSEY C. PINKERTON SCHOLARSHIPS.—two general scholarships for graduates of the schools of the city of Worcester.

SEARS SCHOLARSHIPS.—The Sears Roebuck Company provides for eight scholarships of \$125.00 each which are awarded annually to deserving students in the freshman class who desire to major in Agriculture. This year the Sears Roebuck Company made similar grants to women students majoring in Home Economics.

WHITING STREET SCHOLARSHIP.—Scholarships of \$50 each for deserving students.

HELEN A. WHITTIER SCHOLARSHIP.—for a deserving woman student in art as applied to living.

There are also the following special scholarships:

COTTING MEMORIAL SCHOLARSHIP.—all college expenses of freshman year—for a woman student. Recipient of this scholarship is selected by a committee of the New England Branch of the Farm and Garden Association from among candidates proposed by State Leaders of 4-H Club work in the New England states.

WILBUR H. H. WARD SCHOLARSHIP.—Twenty-five scholarships of approximately \$100, known as the Wilbur H. H. Ward Scholarships. The Wilbur H. H. Ward Fund is administered by a Board of Trustees independent of the University. Applicants for these scholarships write to Sumner

R. Parker, who may be addressed at the University. They are available only to Hampshire County boys.

THE ISOGON AWARD.—An award by Isogon, the senior women's honorary society, to a young woman student at the end of her junior year. This award is made on the basis of character and personality, scholastic achievement, campus influence and service.

GEORGE L. FARLEY SCHOLARSHIPS.—The Massachusetts Society for Promoting Agriculture has established a scholarship in memory of George L. Farley. The income of approximately \$60 per semester is awarded to deserving 4-H Club members, men or women, recommended by the State Leader of 4-H Clubs from applications submitted to County 4-H Club Agents.

Esso 4-H SCHOLARSHIP.—Every year the Colonial Beacon Oil Company awards a scholarship of \$400.00, one-fourth of which is paid each year to a 4-H Club member enrolled in some course related to Agriculture. Selection is on the basis of need, merit, and ability. Applications should be sent to County 4-H Club Agents.

THE BORDEN COMPANY FOUNDATION.—Provides an annual Scholarship Award of \$300 to that senior student in Agriculture who has achieved the highest average grade in all college work preceding the senior year. No student whose curriculum did not include at least two courses in Dairy subjects is eligible.

ASCENSION FARM SCHOOL SCHOLARSHIPS.—The trustees of the Ascension Farm School offer annually approximately \$2400 for scholarships. These are restricted to men from Western Massachusetts who are studying in the fields of Agriculture and Horticulture.

ENGINEERING ALUMNI SCHOLARSHIPS.—Provided by annual contributions from graduates and friends of the School of Engineering to provide tuition scholarships to deserving and well-qualified students pursuing work in a major field of Engineering. They are available to freshmen and upperclassmen.

NATIONAL ASSOCIATION OF THOROUGHBRED BREEDERS SCHOLARSHIP.—A substantial award granted by the National Association of Thoroughbred Breeders to a freshman who is a member or former member of the Future Farmers of America. The award is established at various other universities as well as at the University of Massachusetts. Applications should be made to the Chairman of the University Scholarships Committee.

UNIVERSITY SCHOLARSHIP.—A limited number of scholarships of \$100.00 or more, awarded on the basis of leadership, need, scholarship and participation in extra-curricula activities.

LOANS

Through the generosity of friends of the University, funds have been donated to provide loans for a limited number of students of the three upper classes to assist in paying tuition or other college expenses. These loans are granted, after proper consideration, to needy students of good scholarship whose habits are economical. All loans are secured by a note endorsed by a responsible party as collateral. All such loans must be paid before graduation. Upon withdrawal from the University, loans automatically become due. Interest is charged at the rate of 3% to maturity, 5% thereafter on loans from all funds except the Lotta Agricultural Fund, from which loans are made without interest. Application for loans should be made to the Student Aid Committee, Placement Service Office, South College. No loan will be granted in excess of \$200 in any one year.

If funds are available at the beginning of the second semester, loans may be made in exceptional cases to members of the Freshman class whose scholastic record is satisfactory and whose budget calculations have been upset through circumstances beyond their control.

DANFORTH KEYES BANGS FUND.—This is a gift of \$6,000 from Louisa A. Baker of Amherst, the income of which is used in aiding poor, industrious and deserving students to obtain an education in the University of Massachusetts.

LOTTA AGRICULTURAL FUND.—A limited number of loans are made to students from the income of this fund. Such loans are made without interest but only to deserving students of high scholastic rank. This fund is administered by a Board of Trustees independent of the University although loans are made only upon the recommendation of the President of the University.

VINCENT GOLDTHWAIT MEMORIAL LOAN FUND.—A gift of \$5,000 from Dr. Joel E. Goldthwait in memory of his son. This fund is used almost entirely for students in the Stockbridge School of Agriculture.

FRANK A. WAUGH FOUNDATION.—Graduates of the Department of Landscape Architecture and friends of Professor Frank Waugh have established this fund, to be used in part for loans to deserving seniors and fifth year students of that department. Requests for loans shall be reviewed and approved by the head of the department of Landscape Architecture and submitted to the Board of Trustees of the Foundation, who shall make final decision as to granting of the loans and amounts thereof.

4-H SCHOLARSHIP AND LOAN FUND.—This fund is under the supervision of the State Leader of the 4-H Clubs and is used to aid students preparing for agricultural and home economics service.

NATIONAL PEST CONTROL ASSOCIATION LOAN FUND.—A fund established by the National Pest Control Association for needy students in the field of Entomology.

THE PLACEMENT SERVICE

The University maintains a centralized Placement Service, the function of which is to assist students to secure part-time, summer, or permanent employment and to administer the required Placement Training Program.

The University is keenly interested that each graduate has an opportunity to serve his fellow men in a socially desirable occupation consistent with his interests, abilities, aptitudes, and education. To assist students to accomplish their objectives, the following aids are available: cumulative student personnel records, occupational information library, counselling and guidance in job hunting techniques, preparation of credentials and personal data sheets and personal interviews.

The Placement Service is the clearing center for all part-time jobs at the University. Students are assisted in obtaining part-time work during the college year and full-time work during the summer vacation. Employment is not guaranteed, but every effort is made to help those students who must work to meet their college expenses. In order to give assistance to as many needy students as possible, the Student Aid Committee has adopted the policy of limiting the maximum financial aid per student to the equivalent of board. The average earnings of students engaged in part-time work is approximately \$100.00 per year.

VETERANS' AFFAIRS

The Veterans' Coordinator is a member of the Placement Service.

Veterans enrolling for the first time under Public Law 346 must file a Certificate of Eligibility with the Placement Office prior to or at registration. All veterans should clear their affairs through the Placement Service.

HEALTH SERVICE

The Health Service is a separate administrative unit dealing with all matters directly or indirectly influencing or affecting the health of staff members, employees, students, or campus visitors.

The University endeavors to safeguard the health of all students while on the campus. Basic medical attention is provided, including preliminary diagnosis, primary treatment of injuries, and temporary care of the sick. A group of three infirmary buildings and a staff of resident physicians and resident nurses are available to perform these functions.

- (1) Physical examination by their local doctor is required of all entering freshmen, re-entering students and all students participating in athletics. Physical report forms for this examination will be mailed to each student with the bill for the first semester and must be completed and returned to the University Health Service not later than September 14, 1953. Evidence of a SUCCESSFUL smallpox vaccination is required.
- (2) The Student Health physicians have offices in the out-patient Infirmary Building, where they may be consulted during college hours.
- (3) The Infirmary consists of 3 buildings, one for bed patients, one for contagious cases, and one for out-patient cases, where the out-patient clinic is conducted daily by the Student Health physicians.
- (4) The students are urged to consult the resident physicians at the first sign of physical disorder, or even for minor accidents. Many severe illnesses and much lost time may be avoided by early or preventive treatment.
- (5) House calls cannot be made to dormitories, sororities, or fraternities except in the case of emergency. The University cannot assure each student that a resident physician will always be available. In such instances students are encouraged to consult a town physician, although any expense connected with such service shall be borne entirely by the student. One resident physician is on call at all times to care for emergencies beyond the scope of the nurse on duty.
- (6) No charge is made to Infirmary bed patients up to seven days in each school year; time in excess of seven days will be charged at the rate of \$4 per day. A nominal charge may be made to out-patients for miscellaneous treatments.
- (7) In addition to the fee charged as specified in paragraph 6, the following additional expenses will be charged to the patient:
 - (a) *Nurses*.—If a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.
 - (b) *Professional Service*.—If a student requires continuous medical attention by a physician, he may be required to select a town physician and become responsible for fees charged by that physician.

- (c) *Supplies*.—Special medical supplies prescribed by a physician will be charged to the patient.
- (d) *Laundry*.—Expenses for personal laundry incurred by students while in the infirmary will be charged to the individual student.
- (8) The Health Service recommends strongly that students participate in the blanket insurance program described in literature accompanying the initial bill rendered students each year. This program is a reimbursement insurance plan providing medical, surgical, and hospital care for both accidents and illnesses at a very low cost. During the past years this plan has saved numerous patients from serious unexpected expense and the insurance payments have enabled the student to stay in school. The University has no financial interest in this and acts only as a clearing house to receive premiums, in order to give the low group rate.

STUDENT HOUSING

It is the policy of the Board of Trustees that freshman men and women students shall be housed in campus dormitories and be required to eat at University dining halls unless given permission to commute. Sophomore and upper-class students will also be required to live in University dormitories in so far as accommodations are available. Those who cannot be so housed will be given permission to live in fraternity or sorority houses or in private homes.

Students who are assigned to housing operated by the University, or homes approved by the University, are expected to occupy them for the entire school year and may not be released sooner except as their places are taken by suitable substitutes.

Dormitories will be open for occupancy at 1 p.m. on the day immediately preceding the opening of the University.

Students assigned to dormitory rooms will be responsible for the room rent of the entire semester. Room rent is not refundable.

Rooms are furnished except for necessary bedding and linen are cared for by the students occupying them. Each occupant is held responsible for any damage.

All student property must be removed from the rooms and the key turned in to the Treasurer's Office immediately after final examinations in June. Such property not removed by the owner will be removed by the University and stored at the owner's expense.

The general supervision of the housing conditions of all students is in charge of the Faculty Committee on Housing.

ROOMS FOR WOMEN STUDENTS.—Dormitory rooms are available for women students at Lewis, Thatcher, Abigail Adams, Knowlton, and Hamlin Houses.

Under the supervision of the Dean of Women, life in each dormitory is directed by a council of student leaders, advised by a full-time Housemother, so that conditions in the residence halls are conducive to study and good living habits. Through the Women's branch of the Student Government, the responsibility is put upon each student to live according to her own best standards as well as according to the standards of the group.

Freshman girls will be assigned rooms in the dormitory and will be notified of the assignment prior to the beginning of college.

Near the close of each year, upperclass women will draw numbers to determine the order in which rooms may be chosen for the coming year.

Only students living in their own homes may commute. Upperclass women may apply to the Dean of Women for permission to live in a sorority house, or to earn room and board in a private home.

ROOMS FOR MEN STUDENTS.—Dormitory rooms are available for men students at Baker House, Mills House, Greenough, Chadbourne, and Brooks Halls, Berkshire, Plymouth, and Middlesex Houses.

All first-year men students will be assigned to campus dormitories. Upperclassmen should make dormitory rooms reservations at the Housing Office before May 1. Those who cannot be accommodated in dormitories will be given permission to live in fraternities or private homes. Assignment of dormitory rooms will be under the supervision of the Housing Office.

ROOMS FOR MARRIED STUDENTS.—The University cannot guarantee facilities for married students; however, those married students who can be accommodated will be housed in the University Apartment Units. Assignments are under the direction of the Housing Office and all inquiries should be addressed to that office. Some students may be able to locate rooms or apartments off campus.

ADVISORY SYSTEM

In order that from the day he enrolls the freshman may have some one to whom he may go for consultation and assistance, each student is assigned to a faculty adviser at the time of registration. It is the function of this adviser to help the student in adjusting himself to the work and life of the University. Academic progress reports issued by the Provost's Office are sent to the advisers periodically, and the students are expected to report to their advisers from time to time to

discuss their academic standing. The adviser also forwards reports of academic standing to the parents. Both students and parents are encouraged to consult with the adviser whenever there are problems regarding studies or personal adjustment to college life.

At the beginning of the second semester of the freshman year each student will discuss his vocational and specialization plans with his adviser. If he can decide definitely upon the department in which he wishes to specialize, and the adviser approves, the student takes his election card to the head of that department for approval. In cases where students are not ready to designate a department of specialization they continue as general majors during the sophomore year under the direction of an adviser assigned by the head of the School in which the student is enrolled. Such general majors must select their field of specialization by the end of the sophomore year.

During the junior and senior years the student is under the guidance of the head of the department in which he is majoring or an adviser assigned by him.

RELIGIOUS LIFE

The University makes an effort to provide a wholesome and stimulating spiritual atmosphere for the students by co-operating with official agencies of the three faiths most largely represented at the University.

On the campus the religious life of Catholic students is enriched by the Newman Club, of which Father David J. Powers of Saint Brigid's Parish is chaplain; Jewish students may participate in services and activities at the local Hillel House, under the chaplaincy of Rabbi Louis Ruchames of Northampton; and Protestant students may join in worship and other religious activities conducted by the Student Christian Association, under the guidance of the Reverend Sydney Temple, chaplain to Protestant students.

The churches of Amherst provide not only the usual opportunities for worship and participation in church work, but special events for students. Students are particularly encouraged to attend Sunday service in the local church of their respective faiths.

ACADEMIC REGULATIONS

FRESHMAN WEEK

All members of the incoming freshman class are required to be in residence on the campus for the period known as Freshman Week. During this period an attempt will be made to orient the student. He will be given psychological and mental tests, and a physical examination. Schedules and section assignments will also be arranged. In addition there

will be lectures on student activities, customs, and curricula, and a scheduled meeting with the student's adviser.

REGISTRATION

Every student must report for registration on the appointed day. All late registrants must pay a \$5.00 fine. No student will be admitted to any class until he has completed the prescribed registration procedure. Changes of courses on the registration card shall be made only by the Registrar's Office.

Any student who does not complete his registration, including payment of semester charges, on the regular registration days will be required to pay a fine of five dollars.

No course will be recorded on the permanent records of the University nor will a student receive credit for it, unless such course appears on the registration card for the semester and has been properly countersigned by the instructor.

ADDING OR DROPPING COURSES

A student may not add or drop a course except with the approval of the Registrar. A course dropped without approval will be recorded as a failure.

CHANGE OF MAJOR

A student wishing to change his major must get a Program Change Card at the Registrar's Office. This change is to be approved by the head of the Department or School in which he is now majoring and also by his new major adviser. This card, properly indorsed, must be returned to the Registrar's Office before the change receives final approval.

MARKING SYSTEM

All grading is done on a numerical basis with 60 per cent the passing grade. If a student takes the final examination and fails to pass, the instructor may report either a condition or failure (F). To remove a condition, the student will have an opportunity to take a condition examination, or he may repeat the course. A failed course must be repeated unless permission to substitute another course is granted by the Committee on Admissions and Standards.

The scholastic record of each student is reported to his parents at the end of each semester. Mid-semester marks are sent to parents for the first semester only. A complete report of the scholarship record of each student during his first semester is sent to the principal of the school from which the student entered.

STANDARDS OF DEPORTMENT

The customary high standard of college men and women in honor, self-respect, and consideration for the rights of others constitutes the ideal of student deportment.

The privileges of the University may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the University, acting through its President or any administrative officer designated by him, distinctly reserves the right, not only to suspend or dismiss students, but also to name conditions under which they may remain in the institution. For example, if a student is not doing creditable work, he may not only be disciplined, but he may also be required to meet certain prescribed conditions in respect to his studies even though under the foregoing rules his status as student be not affected. The same provision applies equally to the matter of absences. According to the rules, juniors and seniors are allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet if in the judgment of the University authorities, a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary; moreover, it may be withdrawn as a punishment for misconduct.

Hazing in the sense of the punishment or humiliation of students is not permitted.

REQUIREMENTS FOR GRADUATION

At the beginning of his freshman year each student selects a school or division in which he will carry his major work. One of the fundamental objectives of all programs, however, regardless of School, is a general cultural education which should be the mark of every college graduate. With this end in view all candidates for the B.S. or A.B. degree must take certain required courses: English 1, 2, 25, 26; Speech 3 and 4; two social sciences to be selected from Economics 25, Psychology 26, and Sociology 28; and twelve semester hours of science. In addition, at least three hours must be elected from one of the following: History 5, 6, 59, 60, or Government 25.

The requirements in Physical Education must also be satisfied. All physically fit men students must take Military 1, 2, 25, and 26.

Since the work of the first two years is directed toward a broad, general education as a foundation for the more specialized training of juniors and seniors, it follows that the program of studies for all schools is fairly uniform up to the junior year. Because of this, students can readily change from one curriculum to another, or even from one school to another as both freshmen and sophomores.

Regardless of major, students who plan to teach should register early, in their freshman year if possible, with the

Department of Education, although their work there does not begin until the junior year.

The minimum requirement for graduation is 60 junior-senior credits in addition to the satisfactory completion of the required and elective work of the first two years. Except upon special permission from the Dean or Registrar, no junior or senior shall enroll for more than 17 or less than 14 credits each semester.

During the junior and senior years, each student shall complete not less than 15, and not more than 30 credits in junior-senior courses in the department in which he is specializing.

It is the policy of the University that the final forty-five semester hours of scholastic work be taken in residence. Residence, for this purpose, is defined as a period of continuous enrollment and regular attendance in classes conducted on the campus of the University.

TRANSCRIPTS

Two transcripts of a student's record will be furnished without cost. For each three additional copies there will be a charge of one dollar.

CONVOCATIONS

Throughout the year each School and Division of the University conducts convocation programs which are especially designed to give students opportunities of hearing from leaders in Science, Art, Government, Education, etc. Some of the convocations are devoted to student activities such as debates, declamation contests, band and musical concerts.

STUDENT ORGANIZATIONS

One of the values received from the University course is the training one acquires through participation in student activities. Student organizations offer excellent opportunities for development of leadership and broadening of outlook.

STUDENT GOVERNMENT

The student Senate operating under the student constitution and composed of elected representatives from the student body is the governing council of undergraduates. Its aim is to promote the general welfare of the University and, in doing so, groups of both students and faculty meet to further their mutual interests. The student Senate directs student conduct and represents the interests of the student body before the faculty.

ACADEMIC HONOR SOCIETIES

PHI KAPPA PHI.—The Massachusetts Chapter of the Honor Society of Phi Kappa Phi was installed on the campus

in 1904. Its prime object is to emphasize scholarship and character. Senior students from all departments of the University are eligible for election to membership provided the scholastic and character requirements of the Society are met.

SIGMA XI.—The Society of Sigma XI is a scientific fraternity to which members are elected on the basis of outstanding scientific research. The local chapter was established in 1938.

UPSILON MU EPSILON.—The Society of Upsilon Mu Epsilon was established at the University of Massachusetts in 1952. Its prime objectives are to emphasize engineering scholarship and character. Senior and junior students in the School of Engineering are eligible for election to membership if they meet scholastic and character requirements of the Society.

STUDENT HONORARY SOCIETIES

ADELPHIA.—A men's senior honorary society, recognizing men students who have been prominent in the extra curricular activities of the campus.

ISOGEN.—A women's senior honorary society. Its purpose is to recognize outstanding women students on the campus.

FRATERNITIES AND SORORITIES

Social fraternities on the campus include Alpha Epsilon Pi, Alpha Gamma Rho, Delta Sigma Chi, Kappa Sigma, Lambda Chi Alpha, Phi Sigma Kappa, Q.T.V., Sigma Alpha Epsilon, Sigma Phi Epsilon, Tau Epsilon Phi, Theta Chi and Zeta Zeta Zeta. An Inter-Fraternity council, consisting of representatives of these fraternities, has charge of rushing and all general matters dealing with fraternity life.

Sororities include Chi Omega, Kappa, Alpha Theta, Kappa Kappa Gamma, Pi Beta Phi, Sigma Delta Tau, Sigma Kappa, and Phi Delta Nu. The Pan-Hellenic Council, made up of representatives from the sororities, supervises rushing and other sorority matters.

ACADEMIC ACTIVITIES

All academic activities are supervised by the Academic Activities Board composed of alumni, faculty, and students, and find recognition in the annual award of gold and silver medals.

THE COLLEGIAN.—This is a weekly newspaper published by undergraduates.

THE QUARTERLY.—A magazine in which the literary and artistic efforts of the students are published.

INDEX.—The year book.

UNIVERSITY HANDBOOK.—Published annually as a campus book of reference.

UNIVERSITY MUSICAL ORGANIZATIONS.—Open to all students of the University. For instrumentalists: Band, Dance Band, Orchestra and Ensembles; for vocalists: Chorus, Chorale, Operetta Guild and small combinations. A Women's Drill Team performs at home games and ceremonies. The University Concert Association provides an annual series of major concerts by famous artists.

Drama is represented on the campus by the Roister Doisters, open to all four-year students interested in the art of the theater; and the University players, open to those students who have shown outstanding ability, effort, and interest in some phase of dramatics through the Roister Doisters.

INTER-COLLEGIATE ATHLETICS

The University is represented in inter-collegiate athletics by teams in all the leading sports including football, soccer, cross country, basketball, swimming, indoor track hockey, rifle and pistol, baseball, track, tennis, and golf. General policies governing athletics are directed by the Joint Committee on the Inter-Collegiate Athletics composed of alumni, faculty, and students.

PROFESSIONAL CLUBS

There are numerous professional clubs established in connection with the various major courses of study. These clubs stimulate the students' professional interest in their chosen subject-matter fields and afford opportunity for discussion of technical subjects of mutual interest.

ALUMNI ASSOCIATION

The Associate Alumni is the general organization of the Alumni, men and women, of the University of Massachusetts. The association maintains headquarters at Memorial Hall, erected by Alumni and friends in honor of those men of the University who died in World War I.

It publishes a monthly bulletin as the alumni publication of the University and, periodically, an Alumni Directory.

The Associate Alumni strives to advance the interests and welfare of the University of Massachusetts in every way possible and cooperates in its educational work.

The organization is presently engaged in extending the facilities of Memorial Hall as a memorial to those men who died in World War II.

Under alumni sponsorship, 9 self-liquidating dormitories have been built on campus and two more are under construction.

The governing body of the Associate Alumni consists of its officers and a Board of Directors. Four directors are elected each year and serve a term of four years. All graduating seniors become members of, and contributors to, the Association at graduation, according to a tradition set by the Class of 1940.

HONORS, PRIZES, AWARDS

SCHOLARSHIP HONORS

DEAN'S SCHOLARSHIP GROUPS.—At the beginning of each semester a list is posted of those students who during the previous semester made a general average of 80 per cent or better. Three groups are recognized: those between 90 and 100; those between 85 and 90; and those between 80 and 85.

DEPARTMENTAL HONORS.—A student who has shown outstanding promise within some department and has maintained a general scholastic average of 80 percent or better is permitted to apply for the privilege of registering for departmental honors. If his application is accepted by his department and the Honors Committee, he is allowed to pursue a course of independent study within the department of his choice throughout his senior year. This may include intensive reading, investigation or laboratory work in connection with some problem that he chooses for his consideration. The objective is to create initiative power of independent investigation and to develop the spirit of research. Although the student is responsible for his undertaking he is encouraged to consult with his department in regard to his work should the need arise. At the close of his study the student presents a thesis covering his investigation. In addition he may be required to appear for an oral or written examination. If by the excellence of his work he satisfies all the requirements of his department and the Honors Committee, his name will appear on the commencement program as receiving honors in the field of his specialization.

SCHOLASTIC PRIZES

PHI KAPPA PHI AWARD FOR SCHOLARSHIP.—Massachusetts Chapter of the Phi Kappa Phi, honorary scholarship society, offers an award of \$50 for outstanding work in scholarship. This is given to some member of the senior class at the opening of school in the fall. The award is based on the record of the first three years.

THE BURNHAM PRIZES.—These were made possible through the generosity of Mr. T. O. H. P. Burnham of Boston. Prizes of \$15 and \$10 are awarded to those students delivering the best and second best declamations in the Burnham contest. The preliminary contests are open under certain restrictions to freshmen and sophomores.

THE FLINT PRIZES.—The Flint Oratorical Contest was established in 1881 by a gift of the late Charles L. Flint, a former president of the College. After his death the prizes were continued by college appropriation. Prizes of \$30 and \$15 are awarded as first and second prizes respectively to those two students delivering the best orations in this contest.

THE HILLS BOTANICAL PRIZE.—This is given through the generosity of Henry F. and Leonard M. Hills of Amherst, for the first and second best herbaria. Competition is open to members of the senior, junior and sophomore classes. First prize is \$20, second prize \$15.

THE BETTY STEINBUGLER PRIZE IN ENGLISH.—This prize was endowed by John L. Steinbugler, New York City, in honor of his daughter Elizabeth Steinbugler Robertson, a graduate of this College in 1929. It is awarded to a woman in the junior or senior class who has written the best long paper on a subject of literary investigation in a course in English during the year.

MASSACHUSETTS SOCIETY FOR PROMOTING AGRICULTURE PRIZES.—Three prizes of \$25, \$15, and \$10 are awarded to those senior students who are judged to have made the best records in the theoretical and practical work in agriculture required in their course of study, and in the special written and oral examination prepared for this award.

ATHLETIC AND ACADEMIC PRIZES

THE ALLAN LEON POND MEMORIAL MEDAL.—This medal is awarded for general excellence in football in memory of Allan Leon Pond of the class of 1920, who died February 26, 1920. He was a congenial companion, a devoted lover of Alma Mater, a veteran of World War I, a fine all-round athlete and a true amateur. He would rather win than lose, but he would rather play fair than win. He has been characterized as a typical student of the University.

THE WILLIAM T. EVANS MEMORIAL TROPHY.—This trophy is given each year to that member of the varsity football team who through his sportsmanship, football ability, character and personality, has thus exemplified the character and spirit of the person in whose memory this memorial trophy is dedicated. The trophy is dedicated to the memory of William T. Evans, a former member of the class of 1942, who died December 9, 1941. This trophy is presented annually by the class of 1942.

THE THOMAS E. MINKSTEIN MEMORIAL AWARD.—This award is made by the class of 1931 in memory of their classmate who died July 16, 1930 while he was captain-elect of football. The award is given to one of the outstanding men in the Junior Class who has as nearly as possible attained those standards of athletics, scholarship and leadership set by him whose memory this award honors.

THE GEORGE HENRY RICHARDS MEMORIAL CUP.—This cup is awarded annually to the member of the basketball team who shows the greatest improvement in leadership, sportsmanship, and individual and team play during the year. It is in memory of George Henry Richards of the Class of 1921 who died suddenly while a student at the College.

THE JOSEPH LOJKO MEMORIAL PLAQUE.—This plaque is presented to a senior who must be a letter man, have a satisfactory scholastic record and show those qualities of enthusiasm and cooperation which make for leadership. It is awarded in honor of Joseph Lojko of the Class of 1934, outstanding athlete who died while a senior in the College.

THE SAMUEL B. SAMUELS BASKETBALL CUP.—This cup is presented annually in the name of Samuel B. Samuels of the Class of 1925 who was an outstanding basketball player during the early years of basketball as a varsity sport at the University. The trophy is awarded to that letter man who is a regular member of the varsity basketball team and who has performed with excellence during scheduled varsity games.

THE E. JOSEPH THOMPSON MEMORIAL TROPHY.—This baseball trophy is given by Thomas Thompson in memory of his brother E. Joseph Thompson who graduated from Massachusetts State College in 1932. He was president of the Student Senate, a varsity letter man in football and baseball, and an outstanding campus citizen. The award goes to that member of the varsity baseball team who best exemplifies the best characteristics of the sport each year.

ACADEMICS CONSPICUOUS SERVICE TROPHY.—This trophy is awarded annually to that student who has made the most unique contribution to the Academic Activities during the year.

ACADEMIC MANAGER'S PRIZE.—Fifty dollars awarded annually to that Academics manager who fulfills his routine duties most efficiently.

MILITARY HONORS AND AWARDS

Competed for yearly and presented at the Final Military Review.

DESIGNATION OF DISTINGUISHED MILITARY GRADUATES.

THE SONS OF THE LOYAL LEGION TROPHY.—Awarded annually by the Massachusetts Chapter of the Sons of the Loyal Legion to the senior cadet ranking No. 1 for the year in Military Scholarship and Efficiency. Winner's name is engraved on a plaque and a sterling silver goblet, appropriately engraved, is given to the individual to keep in his permanent possession.

THE MILITARY DEPARTMENT TROPHY.—Awarded annually by the Military Department, University of Massachusetts, to the Junior cadet ranking No. 1 for the year in Military Scholarship and Efficiency. Winner's name is engraved on a sterling silver goblet and is given to the individual to keep in his permanent possession.

THE AIR FORCE ASSOCIATION MEDAL.—Awarded by the Air Force Association to the outstanding Air ROTC cadet

in the First Year Advanced Course. This award is based on academic and military scholarship grades and individual characteristics of leadership.

THE ELIZABETH L. MCNAMARA TROPHY.—Awarded annually by Mrs. Elizabeth L. McNamara, a trustee of the University for many years, to the cadet ranking No. 1 in scholarship and military efficiency in the second year basic course. Award consists of a permanent plaque with winner's name inscribed thereon.

THE JOHN C. HALL TROPHY.—Awarded annually to the cadet ranking No. 1 in scholarship and military efficiency in the second year basic course. Award consists of a loving cup donated by the class of '02 with the winner's name inscribed thereon, and a sterling silver goblet awarded by Mr. John C. Hall is given to the individual to keep in his permanent possession.

THE AMHERST ROTARY CLUB TROPHY.—Awarded annually by the Amherst Rotary Club to the cadet ranking No. 1 in Scholarship and military efficiency in the first year basic course. Winner's name is engraved on a plaque and a sterling silver goblet, appropriately engraved, is given to the individual to keep in his permanent possession.

QUALIFICATION BADGES U.S. ARMY.—Awarded to cadets who have qualified with the necessary scores with either Rifle or Pistol.

DISTINGUISHED MILITARY GRADUATE.—Each year the USA and USAF appoint cadets to the regular Army and Air Force from a group of Distinguished Military Graduates who have been selected by the Military Department. These cadets are chosen on the basis of outstanding qualities of Military Leadership and Scholarship which have been displayed during the Advanced Course R.O.T.C.

NEWS SERVICE

The University recognizes an obligation to provide the public with accurate information about newsworthy happenings in its educational program. Hence, it maintains a news service as a service to newspapers and other public information media.

The News Service is integrated with the journalism program—this program having the three functions of (1) general education, (2) professional education, and (3) service to on-campus and off-campus journalistic agencies. The News Service is not a publicity office, but an administrative aspect of the University's journalism teaching program.

A Student News Bureau and a Home-Town Personals Bureau, affiliated with the journalism program and the News Service, affords internship training in news writing to a limited number of students.

ADMISSION TO THE UNDERGRADUATE COLLEGE

Those interested in applying for admission to the University of Massachusetts should write to the Registrar to obtain an application form. The first two pages of the application form are completed by the candidate himself. The last two are completed by high school or preparatory school authorities who mail the application form directly to the Registrar of the University. Because of the increasing interest in college level study and the consequent increase in the number of applications, candidates are advised to file their applications at least before March 1st of the year in which they plan to enter.

Because of the increasing interest in college level study and the consequent increase in the number of applications, candidates are advised to file their applications early in the senior year of high school and certainly not later than March 1 of the year in which they plan to enter.

Preference is given to residents of Massachusetts but the University also admits students from other States. A few students from foreign nations are also admitted. Candidates for the freshman class are accepted only for the opening of the college year in September. Students enrolled in other colleges may apply for admission to the Summer Session, but admission to the Summer Session does not necessarily constitute regular admission and enrollment in the undergraduate program of the University.

The University admits young men and women to the freshman class chiefly on the basis of character and scholarship. The general record must indicate promise of success and ability to profit by the opportunities which the University has to offer. Due regard is given to special achievement in specified subject matter fields.

SUBJECT REQUIREMENTS FOR ADMISSION

The subjects of preparatory study required for admission call for the satisfactory completion of a four-year high school course or its equivalent and are stated in terms of units. A unit is the equivalent of at least four recitations a week for a school year. High school graduation alone is not sufficient. The applicant's record must indicate capacity for handling the quality of scholastic work which the University has established as its standard of achievement.

Sixteen units of secondary school work must be offered, selected according to the following requirements:

Algebra	1½
Plane Geometry	1
English	4
Foreign Language (2 years of 1 language)	2
U.S. History	1

The remaining units are elective and may be selected from the following subject matter:

- a. Mathematics
- b. Science
- c. Foreign Language
- d. History and Social Studies
- e. Free electives (not more than four units)

Free elective subjects are those not included in groups a-d, as for example: Music, Art, Drawing, Typewriting, Aeronautics, Agriculture, Home Economics, etc. Such free electives are allowed in order that the student who wishes may have some opportunity to elect other high school offerings, while at the same time covering the fundamental requirements for college work.

Students planning to pursue an engineering curriculum should offer two years of Algebra, one of Plane Geometry, and one-half year each of Trigonometry and Solid Geometry. Chemistry and Physics are also advised. Those deficient in the Mathematics should plan to cover it during the summer prior to entrance or expect to take five years to complete the college course.

In high schools organizing agricultural club work under the supervision and rules of the Junior Extension Service of the University, one credit is granted for each full year of work approved by the State Leaders.

Candidates of exceptional ability and promise may be considered for admission even though some of the prescribed courses were not included in their high school program.

METHODS OF ADMISSION

Plan A. Students applying from accredited schools and making the college recommendation grade of their school in accordance with the subject requirements listed above are considered certified for admission.

Superior graduates of Vocational Schools of Agriculture in Massachusetts and Vocational Agricultural Departments in Massachusetts High Schools may be accepted for the Degree of Bachelor of Vocational Agriculture provided:

- a. They are unqualifiedly recommended by the Vocational Division of the Department of Education as bona fide Vocational Graduates with superior ranks; and

b. That they can present at least 16 units of certified entrance credits, approved as to quality and quantity by the State Department of Vocational Education.

Plan B. Students who are not fully certified will be required to take the Scholastic Aptitude Test of the College Entrance Examination Board. In some cases three Achievement Tests will be required also. The applicant will be informed what tests are to be taken as soon as his application is received or at the time of his personal interview. Candidates will ordinarily take these examinations in the spring of their senior year. Application blanks and a bulletin of general information concerning the tests may be obtained from the College Entrance Examination Board, P. O. Box 592, Princeton, New Jersey.

The University realizes that though almost all students will qualify under either Plan A or B, there will be a few promising candidates who, for one reason or another, are unable to meet fully the subject requirements for enrollment. Such applicants are requested to present their individual problems to the Registrar in order that the Admissions Committee may outline for them what must be done to qualify for enrollment.

ADMISSION TO ADVANCED STANDING

A limited number of students from approved colleges may be admitted on transfer to advanced standing. Since applicants for such admission usually exceed the number that can be accepted, they are placed on a competitive basis. Acceptance will thus depend upon recommendations and quality of record.

Candidates desiring to transfer to the University of Massachusetts from other institutions should write to the Registrar for a regular application form, inasmuch as a student applying for transfer must first of all be able to meet the entrance requirements of the University. Such candidates should also submit the following:

a. A letter outlining reasons for wishing to transfer and describing briefly the type of major work to be followed if accepted for admission.

b. An official transcript of entrance credits and college record to be sent by the Registrar of the College from which he wishes to transfer. This should be forwarded as soon as possible after the close of the semester preceding the one for which transfer is sought.

At least forty-five semester hours of work in residence are required of any transfer student desiring to be recommended for the Bachelor's degree.

UNDERGRADUATE CURRICULA

Undergraduate instruction is organized into a College of Arts and Sciences, the Schools of Agriculture and Horticulture, Business Administration, Engineering, and Home Economics, and Division of Physical Education for men.

This section of the catalogue deals with the opportunities for study and the curricula available in each of these departments of the University.

COLLEGE OF ARTS AND SCIENCES

_____, *Dean*

The College of Arts and Sciences includes the usual subject matter departments in which are offered the courses in general education essential for enlightened citizenship and later specialized and professional training. Most of the courses in the common prescribed curriculum for all freshman and sophomore students, regardless of their field of specialization, are taught in the College.

Each department offers the usual requirements of undergraduate specialization in its particular field. In addition, special curricula are provided to meet the needs of special groups of students. These include curricula for pre-medical, pre-dental, and pre-veterinary students; for those who plan to train as laboratory technicians and to enter the public health service; and for those interested in social work.

CURRICULA IN ARTS AND SCIENCES

The work of the first two years is largely prescribed, specialization occurring in the junior and senior years. The concentration of the junior and senior years gives the students as high a proficiency in their fields of specialization as is possible without sacrificing the objectives and requirements of a well-rounded education. The curriculum for the first two years follows:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1	2	English 2	2
Speech 3	1	Speech 4	1
Math. 7 or 5	3-4	Math. 8 or 10 or 6	3-4
¹ Zoology 1 or Botany 1	3	¹ Botany 1 or Zoology 1	3
Foreign Language	3	Foreign Language	3
² Elective	3	² Elective	3
Military 1 (men)	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

² Those not majoring in biological and physical science departments may take Chemistry 1 and 2 in place of Zoology 1 and Botany 1, or substitute Geology 27 for either Botany 1 or Zoology 1.

¹ Those majoring in biological and physical science departments take Chemistry 1 and 2 (or 4); others take History 5 and 6.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25	3	English 26	3
Sociology 28, Psychology 26, or Economics 25	3	Economics 25, Sociology 28, or Psychology 26	3
¹ Science	3-4	¹ Science	3-4
² electives	6-7	² electives	6-7
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

¹ In selecting the required science course and the two electives, students should be guided by the recommendations for sophomore work given under the descriptions of junior-senior curricula that follow.

JUNIOR-SENIOR CURRICULA IN ARTS AND SCIENCES

Major work is available in the following departments during the last two years.

BACTERIOLOGY AND PUBLIC HEALTH

The department offers three curricula: one in Bacteriology, one in Public Health, and the other in Medical Technology.

BACTERIOLOGY

R. L. FRANCE, *Adviser*

The courses in bacteriology have been planned to furnish (1) a general training in this field for college students; (2) specialization for those contemplating a professional career in bacteriology.

Majors in bacteriology should elect the following in the sophomore year: Chemistry 29, 30; Physics 25, 26; Bacteriology 31; Zoology 35. The physics may be deferred until the junior year to allow for additional language study.

Juniors and seniors must take Chemistry 51, 52, and 79; and Botany 66 and Zoology 84 in addition to the required work in Bacteriology and Public Health.

PUBLIC HEALTH

L. A. BRADLEY, *Adviser*

Through the cooperation of several departments of the university and the Massachusetts Department of Public Health, curricula are provided for (1) a limited number of students interested in the many phases of public health service for which graduate work in medical or engineering schools is not essential; and (2) students planning graduate work in sanitary engineering.

Particular attention will be given to the training of sanitarians, district sanitary officers, food and milk inspectors, water and sewage treatment plant operators, technicians for public health laboratories, and agents for local boards of health. Students planning graduate work in sanitary engineering must also take Mathematics 29 and 30 (calculus) before the end of their junior year.

The following curriculum is required of all upperclassmen:

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Public Health 62, Sanitation	3
Public Health 61 Sanitation	3	Bacteriology 90, Sanitary	3
Chemistry 33 or 51, Organic	4	Chemistry 52, Organic	4
*Electives	6	*Electives	6

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agr. Econ. 79, Statistics	3	Public Health 86, Field Studies in Sanitation	3
Public Health 84, Administration	3	Public Health 88, Epidemiology Communicable Disease Control	3
*Electives	9	*Electives	10

* During the junior-senior years, students elect a minimum of 24 semester credits from the following:

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Hus. 53, Elements of Meat Packing	3	Bact. 82, Food	3
Chem. 63, Water and Sewerage	3	Public Health 64, Planktology	3
Govt. 61, Public Administration	3	Bot. 66, Industrial Mycology	3
Mech. Engineering 1, Drawing	3	Dairy Ind. 52, Market Milk	4
Civil Engineering 77, Water Supply	3	Govt. 62, Public Administration	3
Food Tech. 75, Food Preservation	3	Civil Engin. 78, Sewerage	3
Forestry 51, Management of Water Sheds	3	Ent. 60, Pest Control	3
Geol. 27, Physical Geology	3	Ent. 74, Medical Ent.	3
Vet. Sci. 78, Pathology	3	Food Tech. 92, Food Analysis	3
Zool. 69, Parasitology	3	Home Ec. 52, Nutrition	3

CURRICULUM IN MEDICAL TECHNOLOGY

R. L. FRANCE, *Adviser*

This curriculum provides a broad fundamental training for young women who plan to qualify as medical technologists. The program more than meets the basic collegiate requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists. Students taking this curriculum should be prepared to spend a year's internship in a certified hospital laboratory after graduation.

Students taking this curriculum should complete the following sciences in the sophomore year: Bacteriology 31; Chemistry 29, 30; Zoology 35, and Physics 25, 26.

The junior-senior program follows:

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Bacteriology 52, Advanced	3
Chemistry 33 or 51, Organic	4	Chemistry 52, Organic	4
Public Health 61, Sanitation	3	Public Health 62, Sanitation	
Zoology 51, Microtechnique	3	or Public Health 88, Com-	
*Electives	3	municable disease control	3
		*Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 81, Applied	4	Bacteriology 82, Applied	3
Bacteriology 85, Serology,		Bacteriology 92, Clinical	3
Immunology	3	Chemistry 80, Clinical	3
Zoology 69, Medical		*Electives	6
parasitology	3		
*Electives	6		

* During the junior-senior years students elect 21 credits from the following:

History, required course	Zoology
Chemistry 79, Physiological	Physics 25, 26 Introductory
Chemistry 82, Qualitative organic	Liberal Arts

BOTANY

T. T. KOZLOWSKI, *Adviser*

The purpose of the courses in botany is to provide a thorough background for specialization in the science, and to support and supplement the work of other fields in which knowledge of plant life is held to be important. Certain courses should likewise prove of interest and value to the general student.

Those who wish to specialize in Botany will find here an ample field and an adequate opportunity for advanced undergraduate study. Post-graduate training, often with provision for financial aid, is available in most graduate institutions, and many teaching, research and industrial positions in schools, and colleges, experiment stations, federal and state services and private enterprise are open to the trained botanist.

The curriculum offers to the student an opportunity to acquire either a broad general knowledge of Botany, or to devote himself to more extensive study in one of the major divisions of the science, such as Plant Morphology and Taxonomy, Plant Physiology, Mycology and Plant Pathology. Under the direction of his adviser each student selects a program of courses in botany and other sciences, humanities and arts which seems best adapted to his particular botanical objectives.

Specialization in Botany assumes the satisfactory completion of certain basic and supporting courses prior to the junior year. These include Botany 1, 25 and 26; Chemistry 1, 2 and 29; and a Modern Language. Two years of German are advised.

The junior-senior program requires that courses in Botany to the amount of 15-30 credits be chosen under the guidance of the adviser. He will also make recommendations in regard to electives.

CHEMISTRY

W. S. RITCHIE, *Adviser*

The objectives in chemistry are to give the student an understanding of the subject which will enable him to appreciate the relation of chemistry to other sciences, and to industry, and to provide training for those who intend to become teachers and workers in the allied sciences, and for those who wish to go on to graduate study and into a professional career in chemistry. Completion of the course in chemistry fits the student for positions in the chemical industries and related fields as well as in the agricultural industry, for employment in state and Federal agricultural experiment stations and commercial laboratories, for teaching and for graduate study.

Students planning to major in Chemistry should elect German in the freshman year. The sophomore program should include Chemistry 29, 30; Mathematics 29, 30; and Physics 25, 26.

Work for the junior and senior years includes required courses in Analytical, Organic, and Physical Chemistry and the possibility of election in related and supporting fields. While the major is arranged to provide general and fundamental training in the science, work in the humanities and social sciences is also recommended. The desirability and necessity of a well rounded education must not be overlooked.

ECONOMICS

P. L. GAMBLE, *Adviser*

In Economics the aims are twofold: (1) to give the student an understanding of economic theory and of the application of economic principles to the organization of society;

(2) to provide students with the elementary training necessary for further study of economic and business problems.

The department requires that all majors irrespective of the career desired take the following courses: Economics 53, 73, 79, Accounting 25, and Agricultural Economics 79 or Mathematics 62. In addition, each student must select an additional 12 credit hours of work from the Economics curriculum. No major student is permitted to take more than 36 junior-senior credit hours of economics, agricultural economics and business administration courses. In choosing elective courses students are urged to select courses in the humanities and preferably some from the allied fields of history, philosophy, psychology, and sociology. Those intending to major in Economics should elect Economics 26 in the sophomore year.

For the majors in the Economics department, there are offered courses which may be combined to serve as preparation toward a number of different careers. Among others, possible careers in the following fields are open:

Banking and Finance	Public Utilities
Government Service	Social Security
International Trade	Statistics
Labor and Personnel Relations	Transportation and Communication

EDUCATION

A. W. PURVIS, *Advisor*

The department through its undergraduate program seeks to utilize the forces of the University to prepare teachers for elementary and secondary schools and personnel for the various phases of recreation education. Through its graduate offering it seeks to prepare administrators and specialists in public education and recreation. Its program is based upon the assumption that teachers and recreation leaders should have a broad liberal education, considerable mastery of at least one field, and professional courses which should lead to a knowledge of the persons to be taught, familiarity with the problems to be met, and practice in the best techniques of teaching and leadership.

In order to realize these aims, all students who contemplate teaching or recreation as a career should register early, in their freshman year if possible, with the Department of Education although their work there does not begin until the junior year. Admission to either a minor or major in Education to prepare for teaching will be determined largely by a composite rating based on scholarship as determined by University grades and success in the beginning course in History of Education, and on personality ratings by members of the staff.

Currently there are two avenues leading toward a career of teaching in either elementary or secondary schools. The student may (1) major in Education or (2) minor in Education and major in a subject-matter field. Although the department does not insist there are strong arguments in favor of the latter procedure. In either case the program in Education is essentially as follows:

FOR ELEMENTARY SCHOOL TEACHING (D. J. McCarthy, adviser)—either a minor or major in Education. Arrangements have been made for students to major in English, History, Psychology or Home Economics and still obtain the required courses.

Junior Year: Education 51, 64, Music 62, Psychology 94.

Senior Year: one full semester Education 60, 61, 62, 85. Art 33 and 34 are strongly recommended.

FOR SECONDARY SCHOOL TEACHING—either a minor or major in Education.

Junior Year: Education 51, 52, 83, 88.

Senior Year: Education 53, 85.

Several cooperative special-field programs for teachers have been developed as follows:

TEACHER-TRAINING IN AGRICULTURE. (C. F. Oliver, adviser.) By a cooperative agreement with the State Division of Vocational Education, persons otherwise qualified may prepare to teach vocational agriculture by the satisfactory completion of Education 72, 73, and 75. Education 52 is also recommended. To insure a desirable range of preparation, students who contemplate vocational teaching should consult (early in the freshman year if possible) Professor Oliver and the State Supervisor of Agricultural Teacher-Training. A vocational teacher-training certificate is awarded by the Vocational Division to those who fully qualify.

TEACHER-TRAINING IN HOME ECONOMICS. (Mrs. S. C. Piatt, adviser.) These students will major in home economics and elect Education 51, 53, 83, and 85. Home Economics 81 and Psychology 55. A selected few may be chosen each year for the One-Semester Plan.

TEACHER-TRAINING IN PHYSICAL EDUCATION. (H. M. Gore, adviser.) These students will major in physical education and elect at least eighteen hours of the academic field to be taught. They should elect Education 51, 52, 85, and 88, Physical Education 54, Psychology 55.

TEACHER-TRAINING IN MUSIC. (D. Alviani, adviser.) These students will major in Music and elect Education 51, 52, 85, 87, 88, and Psychology 55.

RECREATION EDUCATION. (W. M. Grimshaw, adviser.) The students who desire to train for various positions in the

field of recreation will major in the Department of Education. Positions open in Recreation Education include leadership in such activities as park, community, nature, camping, and institutional recreation as well as teaching. During junior and senior years the students will undertake a core program consisting of Recreation Education 51, 52, 54, 75, 76, and 77. After consultation with his adviser the student will elect Recreation Education 53 or 78 or any other course which seems to meet his individual needs.

ENGLISH

F. P. RAND, *Adviser*

The department of English offers courses in English composition and literature and in speech. Students majoring in this department must conform to the institutional and school requirements for freshman and sophomore years, and in choosing sophomore electives should include two semesters of modern language and one semester of English history.

The courses in English are intended to enable students to express themselves effectively and to appreciate humanistic values and the ideals of English-speaking people throughout their history. They also offer an appropriate, and in some instances an adequate, classroom training for work in such fields as teaching, authorship and editing.

The student must earn 30 credits in elective courses in English. However, for six of these he may substitute elective courses in technical writing, other languages or speech.

JOURNALISM

The journalism courses are designed to provide professional guidance for students interested in newspaper work or related fields. Such students are advised to compete for membership on the college newspaper while freshmen or sophomores, take the introductory course (Journalism 85) as juniors, and elect other courses in social science and literature. Selected seniors will be provided a limited amount of actual professional experience.

ENTOMOLOGY

C. P. ALEXANDER, *Adviser*

Courses in entomology serve a variety of functions, such as to give students a broad knowledge of insects, particularly in their relations to man, his crops, his animals, and his health. Students are trained to become entomologists in the service of the United States, or in various state, territorial, or foreign services, especially in the field of agriculture. Other fields of training include forest entomology; medical entomology; control of pests in buildings; research, technical service or sales work with manufacturers of insecticides; teachers of zoology, particularly entomology, at the university level; and various other branches.

The courses in beekeeping are offered with the following aims: (1) to meet the increase in vocational opportunities for the production of bees or honey as a business; (2) to study the beekeeping needs of fruit and truck-crop industries and the part that bees play in the pollination of flowers; (3) to acquaint the student with a recreational field that can be made profitable.

Majors are required to take Entomology 26 in the sophomore year. Strongly recommended sophomore subjects include Botany 25, 26; Zoology 25; Chemistry 29, 30; Zoology 35; and either French or German, or both.

Juniors and seniors should support their work in entomology with the following courses: Botany 51, 52; Bacteriology 61, 62; Chemistry 51, 52; Zoology 51, 69, 70; Pomology 56; English 84; and selected courses in education, floriculture, forestry, horticulture, and other subjects.

FINE ARTS

D. ALVIANI, *Adviser*

The department of Fine Arts is interdepartmental and interscholastic. The present aim of the department is to bring together art, music, and other courses until the growth of the work in these various artistic fields permits the development of several special departments. The work in art and music is basic in its approach to theory, practice, history, interpretation, and quality, so as to provide a better understanding and appreciation of these arts. A person majoring in the Fine Arts may obtain preliminary training in preparation for graduate study or a teaching career in one of the Arts. In addition, the department has made arrangements with well-qualified private teachers to offer instruction, without course credit, in vocal and instrumental music to individuals or class groups.

The student majoring in fine arts is required to elect not less than 28 nor more than 30 credits from among the courses listed below. At least 15 credits must be from Group A or from Group B, and the student's adviser is assigned on this basis.

A	B	C
Music 25, 26, 27, 28, 29, 30	Art 33, 34	Home Ec. 31
Music 51, 52	Art 27, 28	Psych. 56, 62
Music 61, 62	Art 31	Hist. 53, 69, 72
Music 75, 76	Art 75	Govt. 28
Speech 89	Land Arch. 84	Phil. 82
Journalism 85	Art 77, 78	Physics 60
	Home Ec. 26	Engl. 68, 74, 77, 84
		Soc. 28
		Ed. 51, 52, 53, 66, 94
		Bus. Law 70
		Marketing 54
		Speech 91

GEOLOGY AND MINERALOGY

L. R. WILSON, *Adviser*

The offerings in geology and mineralogy are intended chiefly for those who wish to gain some acquaintance with one or more branches of earth science. For the general student prerequisite requirements are reduced to a minimum. A program of moderate specialization may be provided for science majors who are interested in geology.

To major in geology a student must complete thirty credit hours of work in the department. Those who have completed nine or more credits in geology in addition to the sophomore courses by the end of the junior year, and who wish to satisfy major requirements for graduation in the field of geology, will be given individual or group problems in the senior year. The nature of the work will depend upon student interest and preparation. In any junior or senior course in geology an additional period per week without credit may be required of students who specialize in this field. Chemistry through qualitative analysis and a year's work in college physics represent minimum requirements in these respective fields for undergraduate specialization in physical geology. For those interested in pursuing studies in stratigraphy or paleontology, work beyond the freshman year in the systematic aspects of both botany and zoology is essential for satisfactory progress.

GERMAN

F. C. ELLERT, *Adviser*

The courses in German are intended to give a practical knowledge of the language for the purpose of wider reading, research, and oral communication.

During the junior and senior years each student will complete not less than 24 and not more than 30 credits in the junior-senior German courses. Students planning to use the language professionally are also urged to supplement their courses here with a summer session at an approved school of German.

HISTORY AND GOVERNMENT

HISTORY

T. C. CALDWELL, *Adviser*

The courses in history are intended to impart an understanding of the people of the world and their problems through an analysis of man's development in the past. A major in this field should provide the student with a broad cultural background and a basis for good citizenship. History may have special value for the following groups:

(1) Those who plan to teach history or the social studies.

(2) Those who plan careers in which considerable knowledge of history is desirable. These might be in fields such as law, government service, journalism, and library work.

Prospective majors should ordinarily elect History 31 and 32 in the sophomore year. Government 25 is recommended. Major students must earn a minimum of 26 credit hours in history from the junior and senior courses. The following courses are required: History 59, 60, 91, 92. The student must elect at least two courses from the following group, in which term paper work is required: History 65, 67, 69, 72, 81, 82. He must also elect one of the following courses which deal with a period prior to 1500: History 51, 75, 76. In addition, he should select, in consultation with his adviser, a program of elective courses from fields related to the major.

GOVERNMENT

G. GOODWIN, *Adviser*

The work in government aims to give the student an understanding of the principles of government and their application to the organization of society, and to provide him with elementary training necessary for positions in government service or further study on the graduate level. It thus may be considered either as pre-law or pre-professional work, in addition to its general cultural utility.

Majors in the field should elect Government 25 and 28 in their sophomore year. In the junior and senior years a minimum of eight additional courses in government is recommended; these may be elected from the following: Government 52, 61, 62, 63, 64, 65, 66, 67, 68, 93, 94, or History 53. In addition eight supporting courses in other social sciences are recommended; these may be chosen from the fields of history, economics, sociology, or psychology. The remaining junior-senior courses should be chosen from the fields of languages, literature, philosophy, art, or music.

MATHEMATICS

A. E. ANDERSEN, *Adviser*

The department offers courses designed to furnish a cultural background as well as a foundation for both undergraduate and graduate work in such fields of science as physics and chemistry, in engineering and in other technical subjects.

The courses recommended for majors in the department are designed to prepare students for high school teaching, graduate study in mathematics, actuarial work, statistical work, or work as engineering aides.

All majors are required to take Mathematics 29 and 30 and Physics 25 and 26 in the sophomore year. In the junior and senior years each major must take Mathematics 53, 54, 91, and 92 and must, in addition, complete at least 12 credits in other junior-senior courses. Prospective majors should consult the department, for a list of recommended courses.

PHILOSOPHY

H. N. GLICK, *Adviser*

Philosophy in general attempts to offer a comprehensive understanding of the universe and makes an effort to decide what one should do while living in it. The distinctive purpose of the courses in philosophy is to concentrate on methods of inquiry, standards of thought, search for values in personal and community life, and the analysis of artistic expression and standards of criticism.

The student majoring in this subject will complete a minimum of 21 credits in junior-senior courses in philosophy. A wide range of supplementary courses is advised, among which the following are acceptable: Chemistry 88, Government 66, 71, 82, Education 51, English 51, 74, 79, 80, Art 75, 77, 78, Music 51, 52, History 77, 78, Mathematics 72, Psychology 61, 90, French 51, 52, Sociology 53, 82.

PHYSICS

W. F. POWERS, *Adviser*

The physics courses give opportunity for the study of basic physical laws and phenomena of nature. From these courses students may make a selection to satisfy a major in physics, or to comply with requirements for graduate study.

Majors must take Physics 25, 26 and Mathematics 29, 30 in the sophomore year. Juniors and seniors are advised to support their physics major courses by electives in mathematics, such as differential equations, vector analysis, and chemistry 33. Since the interests of major students vary, the department advisers will be glad to make suggestions regarding programs of study.

PSYCHOLOGY

C. C. NEET, *Adviser*

The courses in the psychology department are designed (1) to impart an understanding of behavior and the application of this knowledge to problems of human adjustment; and (2) to give preparation for professional work in psychology and related fields.

Careers open to psychology majors include: teaching and research, guidance, psychometrics, personnel and industrial

work, child welfare, abnormal and clinical psychology, opinion polling, social work and government service. Additional training is required for certain of these careers.

Students planning to major in psychology should elect Psychology 26 and Psychology 28 in the sophomore year. In the junior and senior years majors are advised to take a minimum of 24 credits in psychology. Courses 51 and 90 are required. As broad a cultural background as major programs will permit is advised.

Majors planning careers primarily in experimental and physiological psychology should plan to take one or more courses during their four years in chemistry, mathematics, physics, and zoology. Those planning careers in abnormal and clinical psychology and in child welfare should elect specified courses in education, English, home economics, sociology, and zoology; while those planning careers in psychometrics, guidance, personnel and industrial work, and government service should take certain courses in business administration, economics, education, industrial engineering, and sociology.

ROMANCE LANGUAGES

Two curricula are offered: French and Modern Languages.

FRENCH

C. F. FRAKER, S. C. GODING, *Advisers*

The courses in French are intended to give a rounded knowledge of the language for the purpose of wider reading, oral communication and research, leading to a better understanding of the art and the science of the nation. Students majoring in French are required to earn 30 junior-senior credits in the department. Those preparing to use the language professionally are usually urged to supplement their courses here with a summer in an approved school of language.

MODERN LANGUAGES

C. F. FRAKER, F. C. ELLERT, *Advisers*

This is a distributed major. The requirements are 30 credits in modern languages, including at least 12 in advanced courses in one of them, and not including the 12 required of freshmen and sophomores.

SOCIOLOGY

J. H. KORSON, *Adviser*

The courses in sociology are planned with two aims in view:

(1) To give the student an understanding of the factors which influence men in their activities and interests as members of society, and

(2) To prepare those students who are interested in teaching at the elementary or high school level; or those students interested in careers with government agencies; or in careers as social workers with state or private agencies to gain the pre-professional courses necessary before embarking on such careers. Some agencies require work on the graduate level before full-time employment is obtained, while others offer in-training opportunities to graduate majors in sociology. Programs for students interested in teaching are prepared in cooperation with the Education department.

All major students are required to take Economics 25 and Psychology 26. At least 24 junior-senior credits in sociology are required. Students are required to take Sociology 53 and 82 and are urged also to select courses in economics, history, government, psychology, and as many in the the humanities as possible.

SOCIAL WORK

The American Association of Schools of Social Work indicates that the pre-professional subjects most closely related to professional work in this field are economics, political science, psychology, and sociology. The Association recommends that prospective students of social work or social administration take not fewer than 12 semester hours in one of these subjects while taking less in others. It also recognizes the value of courses in biology, history, English, as well as other subjects contributing to a broad cultural background for the student.

SPEECH

A. E. NIEDECK, *Adviser*

The program in speech is planned to assist students in the entire university who wish training in oral communication, and to provide an opportunity for students in the College of Arts and Sciences to major in speech and drama. All students planning to major in speech should elect Psychology 26 in their sophomore year. In addition to the courses in the department, speech majors must take English 55 and 68, and Philosophy 82 to fulfill the requirements for graduation.

ZOOLOGY

G. L. WOODSIDE, *Adviser*

The courses in zoology have two major aims: (1) to offer students an opportunity to develop an understanding and appreciation of the scientific method as a part of a liberal education; and (2) to provide training for prospective graduate students in biology; medicine, dentistry, and related fields, as well as future teachers and laboratory technicians in the biological sciences.

The minimum requirements for majors are: Zoology 1, 35, 50, 53, 71, 72, and either 83 or 84; Chemistry 1, 2, 29, 30, 51, 52; Physics 25, 26.

SPECIAL CURRICULA IN ARTS AND SCIENCES

In addition to the major work provided in the departments previously listed, the following special curricula are available. For the most part these cut across departmental lines. Students in these curricula follow the uniform science program for the freshman year and the recommendation in regard to sophomore electives indicated in each curriculum.

PRE-MEDICAL CURRICULUM

Advisory Committee: G. L. Woodside, Chairman, W. L. Machmer, G. W. Alderman, L. M. Bartlett, W. S. Ritchie, J. H. Smith.

Pre-medical and pre-dental students should register with a member of the pre-medical advisory committee as soon as possible after entering the university. Pre-veterinary students may register with the pre-medical advisory committee or with the school of their choice. Pre-medical or pre-dental students will be assigned a member of the committee as adviser, and as long as they remain pre-medical or pre-dental students they will continue under this adviser. The assignment is made alphabetically as follows: A-C, Dr. Woodside; D-G, Dr. Smith; H-L, Dr. Ritchie; M-R, Dr. Bartlett; S-Z, Mr. Alderman. During the second semester of the sophomore year the committee will study the academic record and general qualifications of every pre-medical and pre-dental student. After such careful study specific recommendations will be made as to whether each student should continue with the curriculum or change his objective and choose another major.

During the first two years the student in this curriculum follows the program outlined on page 90. He will be required also to complete fifteen junior-senior credits in the department of his choice, but the member of the pre-medical advisory committee to whom he has been assigned will continue to be his adviser. In the sophomore year the following courses should be elected: Chemistry 29, 30; Physics 25, 26; German 25, 26. In the senior year Chemistry 65, 66 (Physical) is highly recommended (prerequisites, Mathematics 29, 30).

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Zoology 71, Comp. Vert.		Zoology 72, Vert. Embryology	4
Anatomy	4	Electives	9
History	3		
Electives	6		

SENIOR YEAR			
1st Semester	Credits	2nd Semester	Credits
Electives	15	Zoology 84, Cellular Electives	4 12

The electives of the junior and senior years should include the requirements of the department in which the student wishes to major. Pre-medical students should elect as many non-science courses in the College of Arts and Sciences as possible, since Class A medical schools uniformly stress the importance of the broad general education.

CURRICULUM IN NURSING

L. A. BRADLEY, *Adviser*

The opportunity is available for women students completing two years of study to transfer to the Cornell School of Nursing and other accredited Schools of Nursing, and after three years to obtain both the degree of B.S. and R.N. Such students must include in their freshman and sophomore programs six hours of chemistry, six hours of biology, and three hours of psychology.

SCHOOL OF AGRICULTURE AND HORTICULTURE

D. H. SIELING, *Dean*

The School of Agriculture and Horticulture with its several departments offers a broad general education education with specific training in some phase of agriculture or horticulture. Upon the completion of the requirements for graduation, the student will have devoted about one-quarter of his time to pure science, one-quarter to social and humanistic studies, and about one-half to applied science and technology in agriculture and horticulture.

A broad choice of electives within the required courses of each curriculum gives the student the opportunity to prepare for (1) actual agricultural production; (2) research, teaching, or extension work; or (3) industrial work.

Each department of the school has specific requirements for graduation which are included in the descriptive matter under the name of the department. To prevent overspecialization, each student is required to elect at least 12 junior-senior credits in some other school of the University, one-half of these credits to be in the humanities and social sciences.

During the first semester of the freshman year, students interested in teaching vocational agriculture, extension work, or specializing in research work, should consult with the head of the department in which they plan to major.

The School comprises the following departments: Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Dairy Industry, Floriculture, Food Technology, Forestry and Wildlife Management, Landscape Architecture,

Olericulture, Pomology, Poultry Science, and Veterinary Science. Students may major in any one of these departments except Veterinary Science.

CURRICULA IN AGRICULTURE AND HORTICULTURE

All students will take the following uniform curriculum during the first two years:

FRESHMAN YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
¹ Mathematics 7, Algebra and Trigonometry	3	¹ Mathematics 8 or 10	3
² Chemistry 1, General	3	² Chemistry 2, General	3
Botany 1, General	3	Zoology 1, General	3
Military 1 (men)	3	Agronomy 2, Soils	3
³ Elective	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

¹ Candidates for the Bachelor of Vocational Agriculture degree will take Government 25 and 28 in place of Mathematics.

Students who expect to take Calculus in the sophomore year should elect Mathematics 10.

² Those intending to major in Landscape Architecture and Ornamental Horticulture may substitute a foreign language or History 5 and 6 for the year course in Chemistry.

³ Students intending to major in Agricultural Economics, Agronomy, Animal Husbandry, Dairy Industry or Poultry Husbandry will take Animal Husbandry 1, Agriculture. Students intending to major in Floriculture, Foetry, Landscape Architecture, Olericulture or Pomology will take Horticulture 1, Plant Propagation. Wildlife Management majors are required to take a year of modern language and Agronomy² during freshman and sophomore years. Food Technology majors will take Mechanical Engineering 1, Drawing. One year of foreign language may be substituted for Drawing 1 and Agronomy 2 by special permission.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Econ. 25, Psych. 26 or Soc. 28	3	Econ. 25, Psych. 26 or Soc. 28	3
¹ A Science	3-4	¹ A Science	3-4
² Electives	6	² Electives	6
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

¹ To be selected from the following:

Bacteriology 31, 31A
 Botany 25, 26, 28
 Chemistry 29, 30, 33
 Geology 27, 28
 Mathematics 29, 30

Physics 25, 26
 Zoology 25, 35
 Entomology 26
 Civil Engineering 27

² The student will be guided in his selections by his major adviser.

JUNIOR-SENIOR CURRICULA IN AGRICULTURE AND HORTICULTURE

At the end of the sophomore year each student selects one of the following curricula as his major to complete his collegiate training.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

A. H. LINDSEY, *Adviser*

The purpose of the Agricultural Economics and Farm Management major is to train students for positions in those private and government institutions servicing the agricultural industry and to assist in the training of farm managers.

The department maintains an inventory of current price information and agricultural production reports from which price study and analysis may be made. Statistical machines are also available for computation and analysis. The laboratories of the department must be found in business institutions and on farms in Massachusetts with which contact is maintained.

Two curricula are available.

AGRICULTURAL ECONOMICS

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Ec. 55, Mark'g Farm Prod.	3	Ag. Ec. 56, Coop. in Agri. Agricultural Electives	3 6
Ag. Ec. 57, Agri. Credit	3	General Electives	6
Agricultural Electives	6		
General Electives	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25	3	Agri. Ec. 76, Farm Mgt.	2
Agri. Ec. 79, El. Statis.	3	Agricultural Electives	3
Ag. Ec. 75, Farm Mgt.	3	General Electives	11
Agricultural Electives	3		
General Electives	3		

All Agricultural Economics majors must take the courses listed above. Specialization may be in one of the three following fields: (1) Animal products, (2) Fruits and Vegetables, (3) Feeds and Fertilizers.

The following courses should be completed for each of these specialized fields:

<i>Animal Products</i>	<i>Fruits and Vegetable</i>	<i>Feed and Fertilizer</i>
An. Husb. 53	Pomology 53	Agronomy 51
An. Husb. 54	Pomology 77	Agronomy 52
Dairy 52	Olericulture 74	Agronomy 78
Dairy 77	Olericulture 78	An. Husb. 51
Dairy 78	Food Technology 75	An. Husb. 78
Poultry 75		An. Husb. 78
		Poultry 56

FARM MANAGEMENT

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Agri. Ec. 55, Mktg. Farm Prod.	3	Agri. Ec. 56, Coop. Agri. Agronomy 52, Soil Util.	3
Agri. Ec. 57, Agri. Cr.	3	Agri. Ec. 78, Land Econ.	3
An. Husb. 51, Nutrition	3	Bus. Law 70	3
Electives	6	Electives	3

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Agri. Ec. 71, Theory	3	Agri. Ec. 76, Farm Mgt.	2
Ag. Ec. 75, Farm Mgt.	3	An. Husb. 78, Dairy Cattle Prod.	4
Agronomy 51, Field Crops	3	Poultry 78, Management	2
Forestry 55, Mgt. Woodlands	3	Electives	8
Electives	3		

AGRONOMY

W. G. COLBY, *Adviser*

The department of agronomy is equipped with modern soils, crops and chemical laboratories, greenhouses, and utilizes parts of the university farm for fertilizer and plant growth experimentation, and for demonstration of soil utilization and conservation.

The courses are designed to give instruction concerning the basic knowledge of the soil and its management, fertilizers, and their uses as related to the principal products of the field. Crop improvement practices and the science of crop improvement are stressed for those who are interested in agronomy as a specialty.

There is sufficient flexibility within the curriculum to allow the student to specialize in soil science, plant science, soil conservation or general agronomy. Those students who have a desire to receive training which will qualify them for investigational work in these fields may obtain it by selecting appropriate supporting science or vocational subjects as electives. This training equips them to serve as specialists in one of these selected fields for industrial corporations and may serve also as training for extension or teaching work.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Agron. 57, Soil Formation	3	Agron. 52, Soil Utilization	3
Zoology 53, Genetics	3	Electives	9
Electives	6		

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Agron. 51, Field Crops	3	Agron. 78, Fertilizer and Soil Fertility	3
Chem. 51, Organic	4	Chem. 52, Organic	4
Electives	9	Electives	9

ANIMAL HUSBANDRY

V. A. RICE, *Adviser*

The broad purpose of the Animal Husbandry major is that of providing the basic training for specialists in animal husbandry. Upon graduation, opportunities are available in the practical, scientific or commercial fields of animal husbandry; i.e., livestock farming, research, teaching, administration, or in the business phases of the livestock industry.

Students who major in the department of Animal Husbandry must successfully complete one summer of placement training as a requirement for graduation.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
An. Husb. 51, Nutrition of Farm An.	3	An. Husb. 56, 56A, Beef and Sheep Production	4
An. Husb. 53, El. Meat Packing	3	Electives	
Electives			

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
An. Husb. 75, An. Breeding	4	An. Husb. 76, Animal Breeding Practice	1
An. Husb. 81, Seminar	1	An. Husb. 78, Dairy Cattle Production	4
Electives		An. Husb. 82, Seminar	1
		Electives	

DAIRY INDUSTRY

D. J. HANKINSON, *Adviser*

Major students in Dairy Industry receive training in the testing, handling, and processing of milk, ice cream, butter, cheese, and other milk products. Practical application is made of chemistry, bacteriology, economics, and engineering in the many phases of dairy work.

The dairy industry department, with student laboratories for the testing and manufacture of dairy products, research laboratories, and commercial scale milk and ice cream plant facilities, is housed in Flint Laboratory, a building devoted solely to dairy work.

Dairy industry graduates may secure responsible positions with commercial dairy manufacturing firms, or with equipment and supply firms. Opportunities are offered also for positions as teachers in high schools and colleges, for service in the fields of extension and research, and for sanitation and public health work with city, state or federal agencies.

Major students in dairy industry must successfully complete one summer of placement training in a dairy plant. It is recommended that this requirement be met during the

summer immediately following the sophomore year of University residence.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 77, Butter and Cheese	4	Dairy Ind. 50, Judging	1
Chem. 51, Organic	4	Dairy Ind. 52, Mkt. Milk	4
Bact. 61, Public Health	3	Chem. 52, Organic	4
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 75, Chemistry	3	Agr. Engin. 80 Food Process	3
Dairy Ind. 79, Seminar	1	Eng.	3
Bact. 81, Applied	4	Dairy Ind. 78, Ice Cream	4
Electives	9	Dairy Ind. 80, Seminar	1
		Bact. 90, sanitary	3
		Electives	6

FLORICULTURE

C. L. THAYER, Adviser

The courses in Floriculture provide for a comprehensive and detailed study of the practices and principles involved in the production, marketing and uses of cut flowers, flowering and foliage plants grown outdoors and under glass. Opportunities available to graduates may include: positions in various fields of commercial floriculture, such as production, wholesale marketing and retailing; employment in nurseries, on private estates and in conservatories; positions in the professional field, including graduate study, teaching in colleges and secondary schools, research and extension work under state, Federal, or other supervision.

It is advantageous for the student to determine, as soon as possible, the type of position for which he wishes to fit himself since the choice of elective courses will depend largely on his decision.

All major students in Floriculture must successfully complete one summer of placement training in work related to their major objective and approved by the Head of the Department. It is recommended that this requirement for graduation be met during the summer following the freshman or sophomore year.

As sophomores majors are advised to take Chemistry 29 and Botany 26 for their sciences. First semester electives should be Botany 25 and Floriculture 25; second semester Entomology 26 and Floriculture 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 51, Greenhouse Mgt.	3	Flori. 52, Flower Arrange- ment	3
Flori. 79, Conservatory Plants or	2	Flori. 54, Greenhouse Const.	3
Flori. 81, Herb. Gardens and borders	3	Plant Breeding 52, Methods	3
Zoology 53, Prin. of Genetics	3	Botany 52, Advanced Plant Pathology	3
Entomology 51, Pests of Special Crops	3	Electives	3
Botany 51, Plant Pathology	3		
Electives	2-3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 75, Commercial	3	Flori. 76, Commercial	3
Flori. 79 or	2	Flori. 82, Seminar	3
Flori. 81	3	Botany 68, Physiology	3
Botany 67, Physiology	3	Electives	8
Electives	5-9		

FOOD TECHNOLOGY

C. R. FELLERS, Adviser

The curriculum in Food Technology provides scientific and applied training in the principles concerned with the processing, preservation, and packaging of foods and food products. Both home and commercial methods of food preservation are considered. Practical work includes canning, freezing, dehydration, and fermentation and salting. Methods of manufacture of jams, jellies, fruit juices, and beverages are part of course work. An effort is made to apply the student's background in chemistry and bacteriology to Food Technology problems and food analysis.

The curriculum gives the student a broad science background with specialized knowledge in food processing and preservation. Special courses are offered for Home Economics majors who plan to teach or do extension work in foods. Major fields open to graduates include: (1) commercial work in cannery, freezer and other plant operation; (2) control and analytical work related to food products; (3) government food inspection and grading; (4) technological work in government and industry.

Ambitious students are encouraged to acquire the background which will enable them to pursue graduate work and research in the application of scientific knowledge to the technology of foods.

The selection of supporting courses depends upon the objective of the student, which should be determined as early as possible.

Food Technology majors should take Physics 25 and 26 and Chemistry 29 and 30 in the sophomore year; also, if

possible, Bacteriology 31 and 31A. Students planning to take Physical Chemistry should complete Mathematics 29 and 30.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 51, Introductory	3	Food Tech. 52, Food Prod.	3
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Bacteriology 51	3	Bacteriology 82, Applied	3
Agr. Engin. 80, Food Eng.	3	Agr. Engin. 82, Refrigeration	2
Elective		Electives	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 61, Industrial Technology	3	Food Tech. 62, Industrial Technology	3
Food Tech. 71, Food Science Literature	2	Food Tech. 72, Food Science Literature	2
Food Tech. 91, Analysis of Food Prod.	3	Food Tech. 92, Exam. of Food Prod.	3
Chemistry 79, Elem. Biol. or	4	Food Tech. 82, Confections and Cereal Products or	2
Chemistry 65, Physical Electives	3	Chemistry 65, Physical Electives	3

SUGGESTED JUNIOR-SENIOR ELECTIVES

Public Health 61, 62, 63	Poult. Husbandry 75
A Foreign Language	Olericulture 73, 74
Mechanical Engin. 1, 63	Botany 66
Pomology 77	Home Ec. 30, 52, 54
Dairy Ind. 75, 77, 52 or 78	Food Tech. 85, 95
Animal Husbandry 53	Chem. Engin. 77, 75
	Indus. Engin. 25, 51

FORESTRY AND WILDLIFE MANAGEMENT

This department offers two curricula, one in Forest Production and Management and one in Wildlife Management.

The technical curriculum of the forestry department is concentrated in the field of forest production and management, and leads to the degree of Bachelor of Science. It has professional status, being accredited by the Society of American Foresters.

The freshman and sophomore years are devoted to studies of basic sciences, English, and other subjects of cultural-foundational value. A required group of three courses—forest mensuration, forest harvesting, and plane surveying—is presented in a nine-weeks summer term immediately following the freshman year. During the summer following the sophomore year qualified students are recommended for work giving practical field experience in forestry. Such employment may be with the United States Forest Service or other public and private agencies.

Ten technical courses in forestry are grouped in the junior and senior years in addition to three supporting courses presented by other departments, a required course in History,

and six student electives. It is intended that the forestry curriculum be as sound professionally and as broad from the viewpoint of general education as is possible within the limits of four undergraduate years.

Students who complete the forestry curriculum with high academic standing may be admitted to graduate professional schools for work toward a Master of Forestry degree. This is usually obtainable within one year.

The forestry courses are open with few exceptions to students other than those concentrating in forestry but should be elected only after consultation with the student's major adviser and with the instructor teaching the course.

Sophomore majors in forestry take Physics 25 and Geology 27 the first semester; Entomology 26, Physics 26, Botany 28, and Forestry 26 the second semester.

SUMMER (FOLLOWING FRESHMAN YEAR)

Forestry 55, Forest Mensuration.	Credit, 3.
Forestry 78, Forest Harvesting.	Credit, 3.
Civil Engineering 27, Plane Surveying	Credit, 3

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Forestry 53, Silvics	3	Forestry 56, Prin. of Silvi-	
Forestry 59, Protection	3	culture	3
Forestry 75, Products	3	Forestry 54, Forest Soils	3
History	3	Wildlife Mgt. 72, Forest-	
Elective (not Forestry)	3	Animal Relationships	3
		Entomology 72, Forest Ent.	3
		Elective (not Forestry)	3

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Forestry 8, Regional Silvicult.	3	Forestry 82, Seeding and	
Forestry 57, Forest Policy		Planting	3
& Econ.	3	Forestry 80, 52, Photogram-	
Botany 51, Plant Pathology	3	metry, Forest Mgt.	3
Electives (not Forestry)	6	Forestry 52, Photogram-	
		metry	3
		Electives (not Forestry)	6

WILDLIFE MANAGEMENT

R. E. TRIPPENSEE, *Adviser*

The courses in conservation and wildlife management are designed for those who desire a general understanding of the renewable natural resources as well as those who expect to make a living in the professional field of wildlife management. Courses are available also to students who expect to major in other fields including agriculture, agronomy, economics, forestry, entomology, and education.

Wildlife management is both an applied science and an art and is concerned with the production and control of animal populations on many types of land including farms, forests, and on waste lands and water areas. Thus an understanding of both the origin and management of land and water is necessary. These background phases include geology, agronomy, forestry, and agriculture. Fields of specialization include fisheries management, game, and furbearer management and control of injurious animals, and related fields such as soil conservation, conservation education, and industrial biology.

Studies in wildlife management are closely correlated with the work of the State Conservation Department and the U.S. Fish and Wildlife Service. During the junior and senior years trips are planned to the bait-mixing station of the U.S. Fish and Wildlife Service, the John C. Phillips Wildlife Laboratory at Upton, Mass. and to numerous wildlife projects in the state. Students are urged to attend the northeastern and the American wildlife conferences.

Graduates in this field are eligible to both state and federal civil service examinations, and most of the permanent job opportunities are in public service either with the state or federal government. A limited number of positions are open in private enterprises. Training in the wildlife field is an excellent background for teaching of science in the public schools and for employment as conservation officers. Much research data and many research operations are available to undergraduates through the Massachusetts Cooperative Wildlife Research Station, and students with sufficiently high grades are eligible for graduate work at other universities.

The courses during the first two years are basic educational subjects required to build a background of sound professional training. Sophomores are expected to take Geology 27, Zoology 35, Wildlife Management 27, Agronomy 2, Entomology 26, and Forestry 26.

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 71 or 75	3	Botany 26	3
Fores. 55	3	Wildlife Management 70	3
Gov't 25	3	Wildlife Management 74 or 84	3
Electives*		Gov't 28	3
		Forestry 56	3
		Electives*	
SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 75 or 71	3	Wildlife Management 74 or 84	3
Botany 53	3	Forestry 52	3
Electives*		Electives*	

* Electives should be chosen in consultation with the student's advisor.

LANDSCAPE ARCHITECTURE

R. H. OTTO, *Adviser*

Instruction in this department has two objectives: first a contribution to general education; second, a preparation of students for the practice of Landscape Architecture. The department offers optional curricula, (1) Professional Landscape Architecture, and (2) Ornamental Horticulture.

LANDSCAPE ARCHITECTURE

Students following this curriculum are prepared to take up work in Landscape Architecture, which leads through field experience or post-graduate study to permanent establishment in the profession.

Sophomores in the first semester elect either Botany 25 or Geology 27 for their science and take Landscape Architecture 25 (Drawing) and Civil Engineering 27 as electives. In the second semester the science is either Entomology 26 or Geology 28 and the electives Landscape Architecture 26 (Drafting) and Horticulture 26 (Plant Materials).

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Elements of Landscape Arch.	3
Landscape Arch. 53, Garden Design	3	Landscape Arch. 54, General Design	3
Hort. 51, Plant Materials	3	Landscape Arch. 86, City Planning	3
Landscape Arch 79, Construction & Maintenance alternates with Landscape Arch. 83	3	Hort. 52, Planting Design	3
Elective	3	Electives	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 81, Advanced Design	3	Landscape Arch. 84, Sketching	2
Landscape Arch. 87, City Planning	3	Landscape Arch. 82, Advanced Design	3
Landscape Arch. 83, alternates with Landscape Arch. 79	3	Art 78, History of Art	3
Electives	6	Landscape Arch. 80, History & Lit. of Landscape Arch.	2
		Electives	5

SUGGESTED ELECTIVES FOR JUNIOR AND SENIOR YEARS

Agronomy 53, 56, Agrostology	Floriculture 81, Herbaceous Borders
Civil Engin. 90, Contracts, Specifications, and Estimating	Philosophy 82, Aesthetics
Agric. Engin. 51, House Planning	Art. 33, 34, 75

ORNAMENTAL HORTICULTURE

The curriculum in Ornamental Horticulture is suggested for those preferring to follow the horticultural phase of Landscape including (1) nursery practice; (2) landscape planting and construction; and (3) maintenance of landscaped areas, such as parks and semi-public institution grounds.

Sophomores in this major will take Botany 25, Civil Engineering 27, Landscape Architecture 25 in the first semester; Entomology 26, Floriculture 26, and Horticulture 26 in the second.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Hort. 51, Plant Materials	3	Hort. 52, Planting Design	3
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Construction details	3
Landscape Arch. 53, Garden Design	3	Pomology 26, Small Fruits	3
Landscape Arch. 79, Construction & Maintenance	3	Landscape Arch. 54, General Design	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 81, Herbaceous Borders	3	Agrostology 56, Turf Mgt.	3
Agrostology 53, Turf Grasses	3	Pomology 56, Spraying	3
Zoology 53, Genetics	3	Plant Breeding 52, Methods	3
Ent. 51, Pests of Sp. Crops	3	Electives	6
Botany 51, Plant Physiology	3		

SUGGESTED ELECTIVES FOR JUNIOR AND SENIOR YEARS

Botany 67, 68, 81	Agronomy 78
Entomology 72	Forestry 56

OLERICULTURE

G. B. SNYDER, *Adviser*

The courses in Olericulture offer a comprehensive training in the scientific principles and commercial practices related to the culture and marketing of vegetable crops. The studies and training involved are set up to prepare graduates to undertake work in the following fields: (1) practical work in operating commercial market garden or truck farms or greenhouse establishments, (2) teaching Olericulture and related subjects in college, secondary or high schools, (3) extension work in Horticulture and Agriculture, (4) research studies with state, Federal, or private agencies, (5) state, Federal, or private inspection service agencies, and (6) the wholesale and retail marketing of vegetables and other perishable commodities.

The department of Olericulture has facilities in greenhouses, plant houses, hot beds, machinery and equipment

used in production and marketing procedures as well as land to provide the student ample opportunity to become acquainted with modern techniques and practices used in handling vegetable crops. Nearby truck farms, wholesale and retail market outlets, variety trial plots of seed companies and inspection agencies are used to demonstrate laboratory and classroom points of discussion.

The rather broad objectives of the training mean that the selection of supporting courses depends upon the specific field in which the student wishes to engage on graduation. This objective should, therefore, be determined as early as possible during the sophomore year.

Majors in Olericulture should take the following courses during the first semester of the sophomore year: Chemistry 29, Botany 25, and Olericulture 25. In the second semester they should include Chemistry 30, Entomology 26, and Pomology 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 51, Nutrient Requirements	3	Oleri. 52, Environment and Plant Culture	3
Zoology 53, Genetics	3	Oleri. 76, Greenhouse Crops	3
Botany 51, Plant Pathology	3	Botany 68, Plant Physiology	3
Botany 67, Plant Physiology	3	Electives	6-8
Electives	5		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 73, Marketing Practices	3	Oleri. 74, Merchandising of Perishables	3
Oleri. 75, Systematic	3	Oleri. 78, Commercial	3
Oleri. 81, Seminar	1	Oleri. 82, Seminar	1
Entomology 51, Pests of Special Crops	3	Electives	10
Electives	7		

POMOLOGY

A. P. FRENCH, *Adviser*

The Pomology courses provide a comprehensive training in the scientific and commercial principles concerned in the growing and marketing of apples, pears, peaches, plums, cherries, and small fruits. Major fields open to graduates include: (1) practical work in connection with the operation of fruit farms; (2) teaching in college, high school, or secondary schools of agriculture; (3) extension work in county, state, or nation; (4) research work with state, federal or private connections; and (5) commercial work in connection with the manufacture and sale of such supplies as machinery, packages, and spraying and dusting materials. Certain supporting courses are required and their selection depends upon the objective of the student. That objective should, therefore, be determined as early as possible.

First semester sophomores are advised to elect Geology 27, Physics 25, and Olericulture 25. In the second semester they should take Chemistry 29, Entomology 26 and Pomology 26.

The selection of junior-senior electives should be undertaken with the help of the departmental adviser. They will depend for the most part on the interests and objectives of the students and his class record to date. The student who wishes to do college teaching, extension work, or research is advised to secure a broad foundation in science and liberal arts, and to plan to enter a graduate school sooner or later. The student whose objective is growing fruit or teaching in secondary school may need to broaden his training in horticulture and agriculture and, again, will need all the science and liberal arts that can be included in the program.

Students majoring in Pomology must successfully complete one summer of placement training on a fruit farm before the beginning of the senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 53, General	3	Pomology 56, Orchard Pest	
Pomology 75, Systematic or	4	Control	3
Pomology 77, Commercial	3	Botany 68, Physiology	3
Botany 51, Plant Pathology	3	Chemistry 32	3
Botany 67, Physiology	3	English 84, Tech. Writing	3
Chemistry 31	3	Electives	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 81, Advanced	3	Pomology 82, Advanced	3
Pomology 75, Systematic or		Pomology 84, Seminar	1
Pomology 77, Commercial	3	Electives	
Pomology 83, Seminar	1		
Zoology 53, Genetics	3		
Electives			

CURRICULUM IN CRANBERRY TECHNOLOGY

This curriculum is designed to provide a broad training in the fields of knowledge which serve as the foundation of the cranberry industry. Its purpose is to provide future leaders and specialists for the industry.

Students who follow this curriculum must satisfactorily complete a minimum of two summers' practical experience in the cranberry industry before the beginning of the senior year.

Courses taken during the freshman and sophomore year will be the same as those outlined for others majoring in Pomology. The choice of junior-senior electives will depend upon the objective of the student and will be made with the assistance of the adviser.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Chem. 33	3	Pomology 56, Spraying	3
Botany 51, Plant Pathology	3	Ag. Econ. 26, Ag'l Prod.	3
Ent. 51, Pests of Special Crops	3	Electives	
Electives			

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Bot. 67, Plant Physiology	3	Bot. 68, Plant Physiol. 3	3
Ag. Econ. 55, Marketing	3	Ag. Econ. 56, Cooperatn.	3
Pom. 85, Cranberry Prob.	2	Pom. 86, Cranberry Prob.	2
Electives		Electives	

POULTRY HUSBANDRY

F. P. JEFFREY, Adviser

The department gives instruction in the science, art and practices of poultry keeping, not only to students specializing in this department, but also to those in other departments who desire supporting work in poultry husbandry. The major courses prepare men for the successful operation of commercial poultry and breeding farms and hatcheries either as owners or managers; for high school, college and federal work in teaching, extension and research; and as service men, specialists and managers in industrial fields allied to the poultry industry.

Students must successfully complete one summer of placement training on a poultry farm or in some business allied to poultry.

Sophomores may choose electives from the list of sophomore sciences or Dairy 25, Animal Husbandry 26, Agricultural Economics 26, Olericulture 25, Pomology 26, Floriculture 26, or Forestry 26.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Poultry Husb. 55, Housing and Sanitation	2	Poultry Husb. 52, Incubation and Brooding	3
Poultry Husb. 53, Judging	3	Poultry Husb. 56, Nutrition	3
Zoology 53	3	Electives	
Electives			

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Poultry Husb. 75, Marketing	2	Poultry Husb. 78, Seminar and Farm Management	3-4
Poultry Husb. 77, Breeding	3	Poultry Husb. 76, Turkey Prod.	2
Vet. Sci. 75, Comp. Vet. Anat.	3	Vet. Sci. 88, Avian Path.	3
Electives		Electives	

VETERINARY SCIENCE

Though major work in Veterinary Science is not available, the department does offer supporting courses to assist students who expect to enter the various fields of agriculture, wildlife management, public health, teaching and laboratory work in the biological sciences or veterinary medicine.

SCHOOL OF BUSINESS ADMINISTRATION

MILO KIMBALL, *Dean*

The School of Business Administration prepares students eventually to assume positions of responsibility in business. An objective of the School is the education of young men and women who will regard management in business as a profession with high ethical standards and broad social responsibilities. The curricula provide preparation for specialized tasks in accounting, finance, industrial administration, marketing, and merchandising. When less specialization is desired, the student selects the General Business program. Each course of study leads to the professional degree of Bachelor of Business Administration.

CURRICULA IN BUSINESS ADMINISTRATION

In keeping with the objectives of the School, the curricula encourage breadth of training for business. General education is emphasized by providing fundamental courses in the humanities, mathematics, science, and social studies. The courses for the first two years are therefore largely prescribed.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Government 25, American	3	History 6, Mod. European	
Mathematics 7 or 5	3	Civ.	3
English 1, Composition	2	Mathematics 8 or 10 or 6	3
Speech 3	1	English 2, Composition	2
Industrial Adm. 11, Indus.		Speech 4	1
Geography or Foreign		Economics 12, Ec. Hist. of	
Language	3	U. S. or Foreign Language	3
Elective, Science	3	Elective, Science	3
Military 1	3	Military 2	2
Physical Ed. 7 (women)	2	Physical Ed. 8 (women)	2
Physical Ed. 3 (men)	1	Physical Ed. 4 (men)	1

¹ Students majoring in Merchandising take a year of foreign language.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25, Principles of	3	Accounting 26, Principles of	3
Economics 25, Elements	3	Economics 26, Distribution	3
English 25, Humane Letters	3	English 26, Humane Letters	3
Psychology 26, General	3	Sociology 28, Elements	3
Elective	3	Elective	3
Military 25	2	Military 26	2
Physical Ed. 33 (men)	1	Physical Ed. 34 (men)	1
Physical Ed. 27 (women)	2	Physical Ed. 28 (women)	2

¹ Students majoring in Merchandising take Home Ec. 2 in place of Acct. 26.

JUNIOR-SENIOR CURRICULA IN BUSINESS ADMINISTRATION

The channels to specialization in a particular area of business lead through basic courses in production, marketing, finance, accounting, statistics and business law. The junior-senior programs are based on this core. Students thus acquire an awareness of each of the fundamental functions of business and develop facility in the use of the basic tools of management. They develop understanding of the relationship of their particular interest to all business activities as well as competence in a special field.

GENERAL BUSINESS

MILO KIMBALL, *Adviser*

This program is given for students whose interest is in general business management. It is designed to provide understanding of the broad administrative aspects of business, and specialized courses are subordinated to a comprehensive program of training. It prepares also for study of a more specialized nature in graduate school.

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Financial Inst.	3	Ec. 56, Business Fluctuations	3
Mktg. 53, Marketing Prin.		Ind. Adm. 66, Transportation	
& Prob.	3	& Traffic	3
Ind. Adm. 63, Mgt. in Ind.	3	Fin. 65, Corp. Fin.	3
Statistics 79, Elements	3	Ec. 70, Monopolies	3
Elective	3	Elective	3

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bus. Law 70	3	Ind. Adm. 80, Adm. Proced.	3
Ec. 73, Modern Econ. Theory	3	Ec. 78, Public Finance	3
Ec. 79, Labor Problems	3	Bus. Law 72, Bus. L. II	3
Professional Elective	3	Professional Elective	3
Elective	3	Elective	3

ACCOUNTING

R. M. COLWELL, *Adviser*

Accounting deals with the problems of measuring, recording, reporting and interpreting business transactions. The courses in this program are designed for the student who wishes to undertake preparation for employment as auditor, controller, cost analyst, industrial accountant, public accountant, private accountant, accounting system designer or teacher of accounting.

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Finance 53, Finan. Inst.	3	Business Law 70	3
Statistics 79, Elem.	3	Acctg. 62, Advanced Acctg.	3
Mktg. 53, Marketing Prin.		English 84, Expository	
& Prob.	3	Writing	3
Acctg. 61, Advanced Acctg.	3	Fin. 65, Corp. Fin.	3
Elective	3	Elective	3

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Ec. 73, Modern Ec. Theory	3	Ec. 78, Public Finance	3
Ind. Adm. 63, Mgt. in Ind.	3	Fin. 82, Investments	3
Acct. 63, Cost Accounting	3	Acctg. 74, Acctg. Systems	3
Acct. 75, Adm. Acct. & Control	3	Acctg. 76, Auditing	3
Elective	3	Elective	3

FINANCE

J. B. LUDTKE, *Adviser*

Courses in banking, finance and insurance are provided for students who expect to assume responsibility for financing a business or to work for banks, investment institutions, brokerage houses, insurance companies, or governmental agencies concerned with finance. The curriculum provides for study of our financial institutions, the procedures of financial organization and administration, the principles of insurance, and training for investment analysis and management.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Fin. 53, Finan. Inst.	3	Ec. 56, Business Fluctuations	3
Fin. 65, Corporation Finance	3	Statistics 79, Elem.	3
Ind. Adm. 63, Mgt. in Ind.	3	Bus. Law 70, Business Law	3
Mktg. 53, Mktg. Principles	3	Professional Elective	3
Elective	3	Elective	3

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Ec. 73, Modern Econ. Theory	3	Fin. 76, Insurance	3
Ec. 79, Labor Problems	3	Ec. 78, Public Finance	3
Fin. 81, Problems of Bus. Fin.	3	Fin. 82, Investments	3
Electives	6	Electives	6

INDUSTRIAL ADMINISTRATION

S. VANCE, *Adviser*

American industry offers to qualifield students the opportunity to find satisfying careers in the various fields of industrial management, labor relations, or personnel management. The program offered is designed to give the student specialized training in these fields and a comprehensive understanding of the problems of industrial enterprises.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Fin. 53, Finan. Inst.	3	Business Law 70	3
Ec. 79, Labor Problems	3	Ec. 80, Labor Legislation	3
Ind. Adm. 63, Mgt. in Ind.	3	Ind. Adm. 66, Transp. & Traffic	3
Acctg. 63, Cost Accounting	3	Mech. Engin. 28, Machine Shop	3
Elective	3	Statistics 79, Elem.	3

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Acct. 75, Adm. Acct. & Control	3	Psych. 86, Industrial Ind. Engin. 88, Time & Motion Study	3
Mktg. 53, Mktg. Prin. & Prob.	3	Mktg. 56, Purchasing	3
Fin. 65, Corporation Finance	3	Ind. Adm. 84, Personnel Adm.	3
Ec. 73, Modern Ec. Theory	3	Elective	3
Elective	3		

MARKETING

H. E. HARDY, *Adviser*

Students in marketing prepare for a variety of occupations in wholesale and retail enterprises, the selling activities of industry and advertising and auxiliary services to business. The program offers general training in business and specialized study of basic types of market operations.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Finance 53, Finan. Inst.	3	Mktg. 54, Sales Mgt. & Salesmanship	3
Mktg. 53, Mktg. Prin. & Prob.	3	Mktg. 56, Purchasing	3
Ec. 79, Labor Problems	3	Business Law 70	3
Statistics 79, Elements	3	Ind. Adm. 66, Transportation & Traffic	3
Elective	3	Elective	3

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Ec. 55, Ec. of Consumption	3	Mktg. 72, Market Research	3
Ec. 73, Modern Ec. Theory	3	Mktg. 74, New England Markets	3
Mktg. 71, Retail Merchandising	3	Psych. 86, Industrial Psych.	3
Mktg. 73, Advertising	3	Professional Elective	3
Elective	3	Elective	3

MERCHANDISING

H. E. HARDY, *Adviser*

This program has been planned in cooperation with the School of Home Economics to meet the growing demand for women with technical training to fill positions of responsibility in merchandising. The program is sufficiently flexible to allow individual choice in the fields of clothing, foods, or home furnishings.

Those interested in emphasis in home economics may refer to the Merchandising and Retailing curriculum in the School of Economics.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Mktg. 53, Mktg. Prin. & Prob.	3	Mktg. 72, Research	3
Econ. 55, Econ. of Consump. or Home Ec. 75, Econ. of Household	3	Business Law 70	3
Home Ec. 51, Food Selection or Home Ec. 57, Clothing	3	Home Ec. 52, Nutrition or Home Ec. 62, Home Furnishing	3
Select.	3	Professional Elective	3
Professional Elective	3	Elective	3
Elective	3		

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mktg. 71, Retail Merchandising	3	Ind. Adm. 84, Personnel Mgt.	3
Mktg. 73, Advertising	3	Home Ec. 88, Appld. Dress Dsn. or	3
Home Ec. 87, Tailoring or	3	Home Ec. 92, Inst. Mgt.	3
Home Ec. 91, Inst. Mgt.	3	Professional Elective	3
Professional Elective	3	Electives	6
Elective	3	Field Work in Retailing	

SCHOOL OF ENGINEERING

G. A. MARSTON, *Dean*

The departments of agricultural engineering, chemical engineering, civil engineering, mechanical engineering and electrical engineering comprise the School of Engineering. Each department offers a curriculum leading to a Bachelor of Science Degree in that particular branch. An optional curriculum in industrial engineering is offered in the mechanical engineering department.

The Civil, Electrical, Mechanical, and the Industrial optional curricula have been accredited by the Engineers Council for Professional Development.

Engineering can be defined as the combination of science and art by which materials and power are made useful to mankind. An engineer requires intensive technical training but at the same time he should acquire the broad education that distinguishes the professional man from the technician. His education does not end with formal schooling but continues throughout his life as he accumulates experience.

The curricula in engineering have been carefully prepared to offer each student the opportunity to acquire a sound training in the fundamental work of the various branches of his chosen field. At the same time he receives a thorough training in the sciences and mathematics, which are the important tools of the engineer. About twenty per cent of his time is devoted to the social and humanistic studies. Some opportunity to pursue his particular interest is offered in the senior year.

The curriculum of the freshman year is the same for all. Specialization to a limited extent begins in the sophomore year.

FRESHMAN YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 5, Analytical		Mathematics 6, Diff. Calculus	4
Geom.	4	Chem. 4, General	4
Chem. 1, General	3	Mechanical Eng. 2 (Drawing)	3
Mechanical Engineering 1		Military 2	2
(Drawing)	2	Physical Ed. 4	1
Military 1	3		
Physical Ed. 3	1		

Elect one of the following:

History 5	3	History 6	3
German 1, 5	3	German 2, 6	3
French 1, 5, 15	3	French 2, 6, 16	3
Spanish 1, 7	3	Spanish 2, 8	3

SOPHOMORE-JUNIOR-SENIOR CURRICULA

Majors in Engineering will select one of the following curricula.

AGRICULTURAL ENGINEERING

H. N. STAPLETON, *Adviser*

Agricultural engineering is concerned with the application of scientific engineering principles to the agricultural industry in which mechanical and electrical power, processing equipment, design and development of a farm structure, soil and water conservation, research, extension, teaching, and promotional activities form parts.

The curriculum is designed to prepare students soundly in basic sciences, engineering, and humanistic subjects for service in this expanding field. There is opportunity for limited specialization and generous provision for electives in the third and fourth years.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Eng. 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	3	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Civil Engin. 27, Surveying	3	Civil Engin. 34, Applied Mech. (Statics)	3
Mech. Engin 39, Materials of Construction	2	Psych. 26, or Soc. 28	3
Military 25	2	Military 26	2
Phys. Ed. 33	1	Phys. Ed. 34	1

SUMMER (6 WEEKS)

Civ. Engin. 28, Prop. & Topog. Surv.	3	Civ. Engin. 30, Route Surveying Prac.	3
(or approved industrial or farm employment)			

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Engl. 83, Tech. Writing	2	Econ. 25, General	3
Civ. Eng. 52, Kinetics	3	Agron. 2, Soils	3
Civ. Eng. 51, Strength of Mat'l	4	Civ. Eng. 61, Testing	2
Elec. Eng. 61, Principles of	4	Elec. Eng. 62, Principles of	4
Mech. Eng. 65, Heat Eng.	3	Mech. Eng. 68, Kinematics	3
Ag. Eng. 71, Mech. Power	3	Ag. Eng. 73, Farm Structures	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Eng. 85, Farm Electrifi.	3	Ag. Eng. 92, Seminar	1
Ag. Econ. 75, Farm Mgt.	3	Ag. Eng. 76, Agr. Machinery	3
Mech. Eng. 83, Machine Design	3	Ag. Eng. 78, Drain, Recl., Conserv.	3
Civ. Eng. 75, Fluid Mech.	3	Civ. Eng. 90, Constr., Spec., Est.	3
Ag.* & Tech.* Electives	6	Ag.* & Tech.* Electives	8-9

* Electives to be selected in consultation with the student's adviser.

CHEMICAL ENGINEERING

E. E. LINDSEY, Adviser

Chemical Engineering is that branch of engineering concerned with the development of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may usually be resolved into a co-ordinated series of unit operations (physical changes) and unit processes (chemical changes). The work of the chemical engineer is primarily concerned with the design, construction, and operation of equipment and plants in which series of these unit operations and processes are applied. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

Chemical engineers are employed not only in these industries manufacturing chemicals but in many others where there occur chemical changes and physical changes other than forming and shaping which is the province of mechanical engineering. Examples are: petroleum refining, coal processing, refractories and clay products, cement, waste treatment, pulp and paper, rayon and textiles, paint and varnish, natural and synthetic rubber, foods, leather, plastics, soap, penicillin and other antibiotics. Much of the work of the atomic energy program is chemical engineering. The types of work done by chemical engineers include: design, construction, research, development, production, financial and patent appraisal, management, and sales.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Appld. Calculus	4	Math. 32, Appld. Calculus	4
Chemistry 29, Qualitative	4	Chemistry 30, Quantitative	4
Physics 25, Mechanics, Sound Heat	4	Physics 26, Light, Elect.	4
Economics 25, Elements	3	Civil Engin. 34, Statics	3
Military 25	2	Military 26	2
Physical Education 33	1	Physical Education 34	

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Chemistry 65, Physical	4	Chemistry 66, Physical	4
Chem. Engin. 55, Calculations	3	Chem. Engin. 60, Heat-Energy	3
Civil Engin. 53, Strength of Materials	3	Chem. Engin. 56, Unit Operations I	3
Elective	3	Elective	3

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Chem. Engin. 93, Comp. Prob.	3	Chem. Engin. 76, Abstracts	2
Chem. Engin. 97, Unit Ops. II	3	Chem. Engin. 94, Comp. Prob. II	4
Elec. Engin. 63, Elements	3	Chem. Engin. 90, Projects	4
Chem. Engin. 75, Instrumentation	2	Elec. Engin. 65, Electronics	3
Chem. Engin. 89, Lab.	2	Elective	3
Electives	3	Psychology 26	3
History	3		

CIVIL ENGINEERING

M. P. WHITE, *Adviser*

The profession of civil engineering once included all engineering except military. Today it includes the design and erection of all type of structures, planning and constructing highways, railroads and airports, hydraulics as applied to river control and waterpower development, irrigation and drainage, water-supply and sanitary engineering, as well as surveying and mapping. Civil engineers may work on designing and planning, on construction, or on maintenance and operation. Those who enter construction must go wherever their projects take them, while those engaged in design, maintenance or operation are generally located in cities or towns.

The curriculum gives a thorough preparation in the fundamental sciences and, at the same time, prepares the student for work in any branch of civil engineering.

SOPHOMORE YEAR

1st Semester	Credits	2nd Semester	Credits
Eng. 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Mech. Engin. 3, Descript. Geom.	2	Elec. Engin. 63, Elements of Civ. E. 34, Applied Mech. (Statics)	3
Civ. Engin. 25, Surveying	5	Military 26	2
Military 25	2	Phys. Ed. 34	1
Phys. Ed. 33	1		

SUMMER (6 WEEKS)

Civ. E. 28, Prop. & Topog. Surv.	3	Civ. Eng. 30, Route Surveying Prac.	3
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JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Psych. 26, Econ. 25 or Soc. 28	3	Econ. 25, Psych. 26 or Soc. 28	3
Civ. Eng. 51, Strength of Mat'l.	4	Civ. Eng. 70, Theory of Structures	4
Civ. Eng. 55, Highway Engin.	3	Civ. Eng. 61, Testing Mat'ls.	2
Civ. Eng. 52, Appl'd. Mech (Kinetics)	3	Civ. Engin. 80, Soil Mechanics	3
Mech. Eng. 65, Thermodynamics	3	Mech. Engin. 59, Mat'l. of Constr.	2
Geol. 50, Engin. Geol.	3	Civ. Engin. 76, Fluid Mechanics	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 71, Structural Design	3	Civ. Eng. 78, Sanitary Engin. II	4
Civ. Eng. 73, Concrete & Masonry	4	Civ. Eng. 90, Contracts, Specif. & Est.	3
Civ. Eng. 77, Sanitary Engin. I	3	Civ. Eng. 92, Professional Sem.	1
Civ. Eng. 81, Foundations	3	Technical Electives (Civ. Eng. 72, 86, 88, 94, 96, Bact. 54, recommended)	6
English 83, Technical Writing	2	Non-Tech. Elective (Bus. Law 70 recommended)	3
Non-Tech. Elective (Am. Gov't. 25 recommended)	3		

ELECTRICAL ENGINEERING

R. R. BROWN, Adviser

Electrical engineering is that branch of the profession covering the engineering applications of electricity. It reaches into practically every profession, every branch of activity, either through performance of the tasks involved, or through their measurement and control. Because it is so diversified in its applications, it is considered to be divided into various fields such as power communications, electronics, illumination, measurements and control and others, each of these having specialized subdivisions.

The undergraduate curriculum is designed to prepare the student for work in any of these fields, and to serve as a basis for specialization in any of them, either in advanced courses or in the field. At the same time, about one-fifth of the student's work is devoted to the humanistic-social courses so that he may have an understanding of the broader aspects of engineering and its relation to other fields of human endeavor.

SUMMER (FOLLOWING FRESHMAN YEAR)

Mechanical Engineering 23, Shop and Civil Engineering, 27, Surveying, 6 credit hours.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Elec. Engin. 41, Elec. & Mag. Circuits	4	Civ. E. 34, Ap. Mech. (Statics)	3
Econ. 25 or Psych. 26	3	Elec. Engin. 42, A.C. Circuits	3
Military 25	2	Military 26	2
Physical Ed. 33	1	Physical Ed. 34	1

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Engin. 53, D.C. Machinery	4	Elec. Engin. 54, A.C. Machinery	4
Elec. Engin. 55, Electronics	3	Elec. Engin. 56, Appld. Electr.	4
Elec. Engin. 57, Diff. Eq. & Vector Anal.	3	Elec. Engin. 58, Elec. Trans. Filters	3
Mech. Engin. 65, Heat Engin. I	3	Mech. Engin. 66, Heat Engin. II	3
Civ. Engin. 53, Strength of Mat.	3	Civ. Engin. 52, Kinetics	3
Econ. 25, Psych. 26, or Soc. 28	3	English 83, Tech. Writing	2

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Engin. 83, Elec. Transcients	3	Elec. Engin. 92, Prof. Seminar	1
Elec. Engin. 85, Elec. Measrmts.	3	Elec. Engin. 80, Elec. Communic.	
Mech. Engin. 79, M.E. Lab. I	2	or	
Civ. Engin. 75, Fluid Mechanics	3	Elec. Engin. 82, Power Appl. in Indus.	5
Technical Elective (Elec. Engin. 79, 81, 91)	4	Ind. Engin. 86, Ind. Mgt.	3
Non-Tech. Elective*	3	Econ. 25, Psych. 26 or Soc. 28	3
		Technical Elective (Elec. Engin. 84, 86, 88, 94, 96, 98)	3 or 4
		Non-Tech. Elective*	3

* Recommended as non-technical electives: Govt. 26, Bus Law 70, Psych. 86.

MECHANICAL ENGINEERING

M. E. BATES, *Adviser*

Mechanical engineering is that branch of the profession which, broadly speaking, covers the fields of heat, power, design of machinery, industrial management and manufacturing problems.

Building upon the foundation laid by the departments of mathematics, physics, and chemistry, the department of mechanical engineering undertakes to show the student how fundamental physical laws apply to this field of the profession. The courses selected give the student thorough training in the basic principles so that particular applications can be mastered in professional practice. Therefore, no attempt is made to give highly specialized instruction.

It must be realized that the modern engineer lives in a time of rapid social and technological change. Only the man who has had a well-balanced cultural and technical program of study can adjust quickly enough to the needs of a continually changing social order. The following curricula emphasize the fundamentals of the four M's of engineering; materials, methods, men, and money, a knowledge of which is vital to the modern engineer.

SUMMER (FOLLOWING FRESHMAN YEAR)

Mechanical Engineering 27 and 28, Shop 6 credit hours.

SOPHOMORE YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Mech. Eng. 39, Mat'l of Constr.	2	Civ. Eng. 34, Appld. Mech. (Statics)	3
Ind. Engin. 25, Prod. Processes	2	Mech. Eng. 46, Fund. of Metallurgy	3
Military 25	2	Military 26	2
Physical Ed. 33	1	Physical Ed. 34	1

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 83, Tech. Writing	2	Psych. 26, Econ. 25 or Soc.	3
Civ. Engin. 52, Appld. Mech. (Kinetics)	3	28	4
Mech. Eng. 63, Eng. Thermo-dynamics	4	Civ. Engin. 76, Fluid Mech.	3
Elec. E. 61, Principles	4	Mech. Eng. 68, Kinematics	3
Civ. Eng. 51, Strength of Mat'l.	4	Mech. Eng. 64, Eng. Thermo-dynamics	3
Civ. Eng. 61, Testing of Mat'ls.	2	Mech. E. 67, Mech. Instr. Lab.	1
		Elec. Eng. 62, Principles	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mech. Eng. 75, Power Plants	3	Psych. 26, Econ. 25 or Soc. 28	3
Mech. E. 77, Internal Combust. E.	3	Mech. E. 76, Ref. & Air Cond.	3
Mech. Eng. 79, Mech. Eng. Lab.	2	Mech. E. 80, Mech. Eng. Lab.	2
Mech. Eng. 83, Machine Design	3	Mech. E. 86, Adv. Mach. Des.	3
Mech. Engin. 85, Dynamics of Mach.	3	Technical Elect.†	6
Mech. Eng. 91, Sem.	1	Non-Tech. Elect. (Bus Law 70 or Psych. 86, Ind. rec.)	3
Non-Technical Elect. (Am. Govt. 25 recommended)	3	†Mech. Engin. 82, Fluid Mach.	
		†Mech. Engin. 88, Steady-Flow Mach.	
		†Mech. Eng. 90, Adv. Metallurgy	
		†Elec. Eng. 64, Ind. Electricity	
		†Ind. Engin. 86, Ind. Mgt.	
		†Mech. Eng. 94, Exp. Mech. Engin.	

INDUSTRIAL ENGINEERING OPTION

W. H. WEAVER, *Adviser*

Industrial engineering is concerned with the engineering aspects of the organization, operation and management of manufacturing plants. It is based on the premise that the operation of a manufacturing plant is fundamentally an engineering activity. Consequently, the industrial engineering curriculum is built on a foundation of mechanical engineering. To the technical knowledge and scientific attitude developed through the study of engineering is added the study of certain courses in the humanities, in economics, and in management.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Econ. 25	3	Ind. Engin. 82, Work Simplification	2
Mech. Eng. 65, Heat Engin.	3	Mech. Eng. 66, Heat Eng.	3
Civ. Eng. 53, Strength of Mat'l.	3	Civ. E. 52, Appld. Mech. (Kinetics)	3
Elec. Eng. 61, Prin. of Elec. Eng.	4	Elec. Eng. 62, Prin. of E. E.	4
Acct. 25, Prin. of Bus.	3	Acct. 26, Prin. of Bus.	3
Ind. Engin. 51, Ind. Mgt.	3	Mech. Eng. 68, Kinematics	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 75, Fluid Mech.	3	Psych. 26 or Soc. 28	3
Statistics 79, Elem.	3	Ind. Engin. 76, Time Study	3
Mech. Engin. 79, Lab. I	2	Ind. Engin. 78, Factory Pl.	2
Mech. Engin. 83, Mach.		Ind. Engin. 80, Budget Con.	3
Design	3	Ind. Engin. 84, Personnel	3
Ind. Engin. 75, Job Evaluation	2	Ind. Engin. 92, Sem.	1
Ind. Engin. 77, Prod. Control	3	Elective	3
Elective	3		

SCHOOL OF HOME ECONOMICS

HELEN S. MITCHELL, *Dean*

The School of Home Economics offers several curricula which are designed to prepare students for a variety of professions as well as for successful homemaking. Professional organizations such as the American Dietetic Association set educational standards for which students may qualify. Courses in various phases of home economics are open to men as well as women.

General education is the objective of the first two years for all students but electives for sophomore year may be chosen in line with the proposed field of specialization. The several curricula offered for the junior and senior years give an opportunity for specialization with some time for electives to further the objective of general education.

When registering for the sophomore year, each student should make a decision as to which home economics curriculum she intends to follow. Some change in emphasis may be made later, but the student is often at a disadvantage if a change in the field of specialization is made later in the college career.

The program of studies for the first two years is largely prescribed.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Chemistry 1, General	3	Chemistry 2, General	3
Foreign Language	3	Foreign Language	3
Home Ec. 1, Introduction	3	Home Ec. 2, Cloth. Select.	
Physical Education 7	2	& Constr.	3
Hygiene	1	Math. 8 or 12	3
Elective	3	Physical Education 8	2

1 Elective to be chosen from the following:

Zoology 1, recommended for majors in Foods and Nutrition, Pre-research, or Child Development.

History 5, recommended for majors in Applied Art, Textiles and Clothing, and Merchandising.

Math. 7.

Botany 1.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Economics 25, Elements	3	Psychology 26, General	3
Chem. 33, Organic	4	Zool. 1 or 35 or	3
Physical Education 27	2	Bact. 31	4
¹ Home Ec. Elective	3	Home Ec. 30, Foods	3
² Elective	3	Physical Education 28	2
		² Elective	3

¹ One of the following electives may be taken during the sophomore year: Home Ec. 31, Applied Art; Home Ec. 26, Textiles, Home Ec. 35, Clothing Construction. If none of these is elected Home Ec. 62 should be elected junior year.

² Other electives: Accounting 25, 26; Art 31, 34; Bacteriology, 31; Chem. 29 and 30; Physics 25, 26; Econ. 26; Government 25; Sociology 28; Zoology 35; Language.

JUNIOR-SENIOR CURRICULA IN HOME ECONOMICS

A student may specialize in one of several fields of Home Economics during the junior and senior years. In consultation with her faculty adviser, each student will choose courses directly related to her objective. To qualify for a B.S. degree in Home Economics a student during the junior and senior years must have at least 15 but not more than 30 credits in the major field and not more than 42 credits in the School of Home Economics. The following courses or their equivalent are required for all majors: Home Economics 51, 52, 75, 77. The following curricula are suggestive. Those interested in other types of professional work should consult with advisers about desirable electives. For students not interested in professional work, a more liberal choice of electives is possible.

CHILD DEVELOPMENT AND FAMILY LIFE EDUCATION

Students interested in child development, nursery school work and social service work should choose this curriculum. The University has arranged for two affiliations for qualified students interested in taking one semester of specialized work elsewhere: with Merrill-Palmer School in Detroit, which specializes in education for home and family life, and with the Nursery Training School in Boston which gives professional training for teaching in nursery schools and kindergartens.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 70, Child Developm't.	3
Psych. 55, Educational	3	Home Ec. 80, Family	3
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 85, Nursery Sch. Mgt.	3	Ed. 85, Practice Teaching	3
Home Ec. 81, Methods	3	Home Ec. 77, Household Mgt.	3
Home Ec. 95, Child Nutr.	3	Electives	9
Electives	6		

FOODS AND NUTRITION AND INSTITUTION MANAGEMENT

This curriculum prepares for such professions as therapeutic or administrative dietitian or nutritionist and meets the requirements of internships approved by the American Dietetic Association. This curriculum is also advised for those interested in home service, food testing and commercial demonstrating related to foods.

Bacteriology 31 and Zoology 35 should be elected sophomore year to satisfy requirements of the American Dietetics Association.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Home Ec. 51, Food Selection	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Household Equip.	3
Home Ec. 81, Methods	3	Home Ec. 70, Child Develop.	3
Chem. 79, Biochemistry	4	Electives	6
Acct. 25, Bus. Acct.	3		

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Home Ec. 71, Retail Fd. Buy.	3	Home Ec. 77, Home Mgt.	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutr. Sem.	1
Home Ec. 91, Institution. Mgt.	3	Home Ec. 92, Inst. Mgt.	3
Home Ec. 93, Experimental Fds.	3	Electives	9
Elective	3		

PRE-RESEARCH IN NUTRITION

This curriculum is planned for the students who wish to prepare for graduate work in nutrition or biochemical research. The course should be planned with the advice of the Dean of the School.

Pre-research majors are advised to elect Physics 25 and 26, and take Chemistry 29 in place of Chemistry 33 in the sophomore year.

JUNIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Equipment	3
Chemistry 30, Quantitative	4	Electives	6
Elective	3		

SENIOR YEAR

1st Semester	Credits	2nd Semester	Credits
Chemistry 79, Biochemistry	4	Home Ec. 77, Home Management	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutrition Sem.	1
Home Ec. 93, Experimental Foods	3	Home Ec. 98, Special Problems	3
Home Ec. 95, Child Nutrition	3	Electives	9
Elective	3		

HOME ECONOMICS EDUCATION AND EXTENSION

Preparation for teaching demands the same basic courses whether a student plans to teach adults or 4-H club groups in Extension, or young people at the high school or junior high school level. In addition to courses required of all home economics students, certain electives are recommended for those planning for any form of teaching. Courses in speech and writing are important. Electives should be chosen in line with special interests or needs. Teachers should be ready to teach some subject other than home economics if demanded; extension workers need special work in rural sociology and adult education. Camp teaching or apprentice training is recommended between junior and senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Foods	3
Home Ec. 31, Applied Art or		Home Ec. 60, Equipment	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 62, Home Furnish.	
Home Ec. 75, Ec. of Household	3	or	
Home Ec. 81, Methods	3	Home Ec. 26, Textiles	3
Education 53, Tests &		Home Ec. 70, Child Develop.	3
Measrmnts.	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Home Ec. 80, Family Life	3
Home Ec. 91, Institution Mgt.	3	Ed. 85, Practice Teaching	3
Home Ec. 93, Experimental		Electives	9
Foods	3		
Psychology 55, Educational	3		
Elective	3		

Any of these junior-senior courses may be taken either year.

Home Ec. 26, 31, 35 may be taken sophomore year.

MERCHANDISING AND RETAILING

This curriculum is planned in cooperation with the School of Business Administration and provides an opportunity for girls interested in preparing for the merchandising field. The junior and senior curriculum includes courses in home economics and in business administration, and should be planned with the faculty adviser by the end of the freshman year if possible. Students choosing this program are expected to take Home Economics 31, Accounting 25, and Economics 26 in the sophomore year, and should plan on at least a year of in-service training after college. If the interest is primarily in business, see the Merchandising major under the School of Business Administration.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 26, Textiles	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 62, Home	
Mktg. 53, Mktg. & Mktg.		Furnishing	3
Problems	3	Mktg. 54, Salesmanship &	
Elective	3	Mgt.	3
		Electives	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 87, Tailoring	3	Home Ec. 77, Home	
Home Ec. 98, Problems	3	Management	3
Mktg. 71, Retail		Home Ec. 88, Dress Design	3
Merchandising	3	Mktg. 72, Mktg. Research	3
Mktg. 73, Advertising	3	Electives	6
Electives	3		

TEXTILES, CLOTHING, AND RELATED ART

This curriculum is of interest to students who may wish to use clothing and related art in a general and aesthetic sense for their personal and family development. Students with ability and professional interest in the artistic and technical aspects of textiles, clothing, and related art are encouraged to go further in this field. They are expected to take Home Economics 31 and Home Economics 26 in the sophomore year. Art 31 is recommended.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 62, Home	
Home Ec. 75, Ec. of		Furnishing	3
Household	3	Electives	9
Home Ec. 81, Methods	3		
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Home Ec. 88, Dress Design	3
Ed. 85, Practice Teaching	3	Home Ec. 98, Problems	3
Home Ec. 87, Tailoring	3	Electives	9
Electives	6		

DEPARTMENTS OF MILITARY SCIENCE AND AIR SCIENCE AND TACTICS RESERVE OFFICERS' TRAINING CORPS

COLONEL V. F. SHAW, *PMST*, *Head*

LIEUTENANT COLONEL J. G. DEHORN, *PAST*, *Head*

Under act of Congress, July 2, 1862, the College was required to provide a two-year course in military instruction under a regular army officer. All able-bodied four-year male students were required to take this course. Under act of Congress, June 3, 1916, as amended by act of Congress, September 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following World War I, under an act of Congress, July 19, 1918, the Reserve Officers' Training Corps was in operation under

the regulation of the War Department, administered by the president of the college and the professor of military science and tactics. Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a horse cavalry unit. The cavalry unit continued training until June, 1943, at which time the Advanced Course ROTC was discontinued for the duration of World War II. From September, 1943 through June, 1946 the Reserve Officers' Training Corps conducted courses in the basic course, branch immaterial only. In September, 1946, the Advanced Course ROTC was reinstated with an Armored Cavalry unit and an Air Force unit. In the fall of 1951 the two units were reorganized as two separate departments.

The primary objective of the Reserve Officers' Training Corps is to provide systematic training at civil educational institutions and to produce junior officers who have the qualifications and attributes essential to their progressive and continued development as officers in the United States Army Reserve or the United States Air Force Reserve. It is intended to attain the objective during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers.

All male candidates for a degree in the four-year course, except veterans, must take the basic course (Air or Army) of at least three hours a week for two years. Veterans are not required to take the basic course, but are eligible to apply for the Advanced Course.

Specialization by air or service begins in the freshman year. The courses of instruction include theoretical and practical work in all phases of military and air science, such as military organization, hygiene and first aid, weapons, maps, military administration, world political geography, military law and boards, and leadership, drill and exercise of command.

Students who are approved by the president of the University and the professor of military science and tactics or the professor of air science and tactics may elect to take the advanced course in their junior and senior years and may be enrolled in the branch in which they completed the basic course. Advanced students will be commissioned in the organized reserve corps, in their respective service, upon graduation. Honor graduates of the Army unit are offered a commission as a 2nd Lieutenant in the Regular Army. All Air Force graduates may compete for a Regular Commission by entering upon active duty after graduation.

The advanced course, in either service, consists of at least five hours per week, and an advanced summer camp of approximately six weeks during the summer vacation between the two years of the advanced course. Students taking the advanced course are paid by the Department of the Army or

Department of the Air Force, at a rate equivalent to the value of the garrison ration, which at the present time is 90c per day, or about \$27.00 per month. The University is granted a clothing allowance of \$100.00 by the United States Government for each advanced course student for the purchase of uniforms. Purchased uniforms become the property of the student upon graduation. Advanced students are paid the pay of the 7th grade (private) while at summer camp.

All basic students are provided with a complete uniform by the department of the Army or the Department of the Air Force. A deposit of \$30.00 is required to cover cost of loss or damage to any articles issued.

DIVISION OF PHYSICAL EDUCATION

W. P. McGUIRK, *Head*

The Division of Physical Education includes the Departments of Athletics, Physical Education for Men, and Physical Education for Women. It offers one major, that in Physical Education for Men.

INTERCOLLEGIATE ATHLETICS

W. P. McGUIRK, *Director*

The following men are in charge of the coaching of the intercollegiate teams:

Charles C. O'Rourke, head coach of football; Chester S. Gladchuk, assistant coach of football; Lorin E. Ball, coach of basketball and freshman coach of football; Earl Lorden, coach of baseball and assistant coach of football; Llewellyn L. Derby, coach of track, cross country, and supervisor of sports publicity; Lawrence E. Briggs, coach of soccer and skiing; Stephen Kosakowski, coach of tennis and supervisor of Stockbridge School athletics; Benjamin Ricci, Jr., coach of lacrosse; Joseph R. Rogers, Jr., coach of swimming and pistol team; Sidney W. Kauffman, assistant director of athletics, director of intramural sports.

PHYSICAL EDUCATION FOR MEN

H. M. GORE, *Adviser*

The Department of Physical Education for Men offers physical activity courses for four years and the opportunity to major in physical education or teacher coaching.

The activity courses which are required the first two years are designed to assist the student to meet minimum standards of physical health and through regularity and continuity of progressively planned exercises, maintain sound physical condition throughout his college career.

Students are expected to attain minimum physical standards established by the department which includes the ability to swim.

The major in physical education leading to a degree of Bachelor of Science in physical education is designed primarily to train the student for a career as a teacher of physical education. It also includes adequate training in other fields of teaching and coaching of interschool athletics. It is contemplated that Physical Education majors will be well trained in general scientific and cultural subjects. They are urged to elect advanced military and those planning on teacher-coaching should take additional work in their particular subject matter fields.

The outline of the Physical Education Major follows:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 7, Algebra and Trigonometry	3	Mathematics 8 or 10	3
Physical Education 21, History	3	Physical Education 22, First Aid	3
Military 1	3	Military 2	2
Physical Education 5, Activity	1	Physical Education 6, Activity	1
<i>Elect two:</i>		<i>Elect two</i>	
Chemistry 1, General	3	<i>(one to be a science):</i>	
Botany 1, Introductory	3	Chemistry 2, General	3
History 5, Mod. European		Zoology 1, Introductory	3
Civiliz.	3	History 6, Mod. European	
		Civiliz.	3
		Government 25, American	3

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Psychology 26, General	3	Econ. 25 or Soc. 28	3
Physical Education 35, Activity	1	Zool. 35, Physiol.	3
Military 25	2	Physical Education 42, Aquatics	3
Electives (one to be a science)	9	Military 26	2
		Phys. Ed. 36, Activity	1
		Elective (one to be a science)	3

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ed. 83, Secondary Schl.	3	Physical Ed. 54, Secondary Schl.	3
Physical Ed. 53, Elem. Schools	3	Physical Ed. 52, Kinesiology	3
Physical Education 51, Anatomy	3	Physical Ed. 64, Activity	1
Phys. Ed. 55, Tests & Measurmt.	3	Ed. 52, Methods	3
Physical Education 63, Activity	1	Electives	6
Electives	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Education 85, Prac. Teach.	3	Ed. 88, School Curriculum	3
Physical Ed. 75, Org. & Adm.	3	Education 85, Pract. Teach.	3
Phys. Ed. 77, Coaching	3	Physical Ed. 78, Coaching	3
Physical Ed. 83, Activity	1	Physical Ed. 84, Activity	1
Electives	9	Electives	9

PHYSICAL EDUCATION FOR WOMEN

RUTH J. TOTMAN, *Adviser*

The courses in physical education for women are planned to provide recreative activity, to develop body grace and efficiency, and to increase health and vigor. No major is available.

The first and second year women students are required to take physical education three times a week and are given two credits for each semester of satisfactory work. Third and fourth year students may elect Physical Education 63, 64, 65, 66.

Girls who are restricted from unlimited activity are placed in classes suitable to their ability. Girls who are restricted from all class activity are assigned to rest periods three times a week and receive their regular physical education credit for satisfactory attendance. A similar rest program is substituted for the regular activity program when girls are temporarily incapacitated.

RELIGION

CHAPLAINS POWER, RUCHAMES, AND TEMPLE, *Advisers*

The courses in the history of religion, the articles of belief and the application of religious principles are given by the Counselors in Religion of the three major western faiths and by others designated by the churches represented. They are financially independent of the University although the facilities of the University are available as for other courses.

Courses are offered in this field for the sake of the student who is interested in rounding out his educational program with the acquiring of a mature perspective in religion. The opportunity is offered for the student to gain a wide knowledge of the forces which have been basic to his culture, an understanding of the religious influences in his own life, and an evaluation of these forces to his society.

No academic credit accrues from participation in the courses in religion, but a record is kept in the Registrar's Office. Students register for these courses at the regular registration period and may do so in addition to a normal semester load.

DIRECTORY OF COURSES

This section contains a list of courses offered in the regular sessions of the University. Course descriptions are arranged alphabetically according to subject matter fields. If any course cannot be found readily, refer to the General Index in the back of the catalogue. A separate bulletin will outline those available during the summer. The University reserves the right to withdraw any course for which an insufficient number of students enroll.

Courses are designated by numbers as follows: freshman 1-24 inclusive; sophomore 25-49 inclusive; junior 50-74 inclusive; senior 75-99 inclusive. Odd numbers designate courses given in the first semester, even numbers those offered during the second. Credit is indicated in terms of semester hours. Where possible, the class schedule follows the course description. A complete schedule of class hours is published at the beginning of each semester.

Students are referred to the section on Divisions of Study and Curricula for a statement of graduation requirements and majors available.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

PROFESSOR LINDSEY, PROFESSOR BARRETT,
ASSISTANT PROFESSOR RUSSELL, MR. CALLAHAN

26. (II) ECONOMICS OF AGRICULTURAL PRODUCTION.—This course considers the principles of production economics. An analysis of specialization, comparative advantage, diminishing, constant, and increasing costs and returns applied to the individual establishment as well as to the nation. A careful study of the combination of the factors of production is made considering the individual's adjustment when operating under monopolistic competition, laissez-faire, and monopoly. Finally, dynamic and static factors are considered in relation to their effects on the individual's production, on the economy of cities and nations, and on the international economy.
3 class hours. Credit, 3.
8:00-8:50 M. W. F. Mr. BARRETT.
Prerequisite, Economics 25.

55. (I) MARKETING FARM PRODUCTS.—Not open to students who have taken or are taking Marketing 53. An analysis of present and past systems of assembling, transporting, distributing, and grading agricultural products. Such aspects as

the adjustment of production and consumption, price formation, channels of distribution, price differentials and margins, public policy, market reporting and forecasting, and a study of the marketing of major agriculture products are considered. Geographic, future, and quality differentials are studied from the agricultural and commercial standpoint. A field trip may be arranged.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

THE DEPARTMENT.

56. (II) THE FUNDAMENTALS OF COOPERATION.—A study of the philosophy and principles of cooperation in Europe and in the United States. The history of cooperation, legal consideration, management, financing, membership relations, methods of formation, sales methods and policies are given full attention. Progress in the cooperative marketing of different agricultural products is studied. One field trip required.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

Mr. CALLAHAN.

57. (I) AGRICULTURAL CREDIT AND LAND APPRAISAL (1950-51).—A study of the development, use, functions, and operations of public and private credit institutions which are available to agriculture. Special emphasis is given to the practical aspects of credit policy and land appraisal. Given in alternate years.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.

Mr. LINDSEY.

71. (I) AGRICULTURAL ECONOMIC THEORY (1951-52).—The course is a comparative and critical study of the significant contributions of the leading economists to the theory of agricultural economics from the time of Adam Smith to the present. Given in alternate years.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.

Mr. LINDSEY.

75. (I) FARM ORGANIZATION AND MANAGEMENT.—This course analyzes the functions of the farmer as a business proprietor. Both the external and internal economic forces affecting the farm business are considered, such as selection and combination of factors of farm production, choice and combination of farm enterprises, the economical use of funds, the nature of farming costs, adjusting farm production to markets and prices, and the management of equipment and labor.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.

Mr. BARRETT.

Prerequisite, Agricultural Economics 26.

76. (II) ADVANCED FARM ORGANIZATION AND MANAGEMENT.—The use of farm records and accounts as a basis for planning and budgeting is emphasized. Measures of success and factors in success in farming, and work simplification as applied to efficient farm techniques are considered. The last part of the course will be given over to the specific study of selected farms and the practical application of the principles and practices already discussed. Field trips are required at an estimated cost of not over five dollars.

1 class hour; 1 4-hour laboratory period.

Credit, 2.

10:00-10:50 Th.; 1:00-4:50 M.

Mr. BARRETT.

Prerequisite, Agricultural Economics 75.

78. (II) PRINCIPLES AND PROBLEMS OF LAND ECONOMICS.—A study of the major contributions by outstanding economic writers to theoretical land economics; a review of American land policies; a presentation of the principles, techniques, and objectives involved in modern land use planning; and a discussion of contemporary land problems in the United States.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

79. (I) and (II) ELEMENTARY STATISTICS.—Methods of collecting, analyzing, interpreting, and presenting statistical data. Sampling principles, averages, dispersion, measures, index numbers, time series and simple correlation are specific fields covered. Practical problems in statistical analysis are given in the laboratory.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. LINDSEY, Mr. RUSSELL.

80. (II) ADVANCED STATISTICS.—This course is primarily devoted to linear and curvilinear multiple correlation analysis. Machine and shortcut graphic methods are used. Some time will also be devoted to probability and analysis of variance.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-1:50 W.; 1:00-2:50 M. F. Mr. LINDSEY, Mr. RUSSELL.

83. (I) ADVANCED FARM OPERATION.—For seniors specializing in agriculture; others by permission of instructor. A study of the efficiency of operations on a specific farm.

3 hours or equivalent.

Credit, 3.

Hours by arrangement.

Mr. BARRETT.

89. (I) 90. (II) SEMINAR IN AGRICULTURAL ECONOMICS.—A study of special problems in agricultural policy, agricultural institutions, market and price analysis.

Hours by arrangement.

THE DEPARTMENT.

AGRONOMY

Professor COLBY, Associate Professor DICKINSON, Assistant Professor THAYER, Assistant Professor EVERSON, Mr. ZAK, Mr. PARSONS.

2. (II) SOILS.—This is an elementary course relating soils and their management to crop growth. This course is designed to give the student a broad background in soil science and its direct application to practical field problems. The course itself is presented with the object of introducing to the student the properties of soils and their influence upon the production of crops. The laboratory work consists of investigation of the fundamental characteristics of soil and basic principles of fertilizer and liming practices.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 3:00-4:50 W. or Th.

Mr. EVERSON, Mr. ZAK, Mr. PARSONS.

51. (I) FIELD CROPS.—A study of the field crops of the United States which will include their uses and improvement, with their soil and climatic requirements. Emphasis will be given to the best farm practices of the northeastern states as to rotation, liming, fertilizing, seeding methods, tillage, disease and insect control, and to methods of harvesting and storage. As an individual problem, each student must take a detailed plan of crop production for the actual conditions of some New England farm.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Mr. THAYER.

52. (II) SOIL UTILIZATION.—The relationship of climate and native vegetation to the broader aspects of soil formation is described. Man's use of land resources is connected to show how the agricultural background of settlers has been active in soil use and abuse. Soil erosion control and its significance to permanent agriculture is considered.

3 class hours. Credit, 3.
8:00-8:50 M. W. F.

Mr. EVERSON.

57. (I) SOIL FORMATION.—The first part of this course considers those physical, chemical, biological, climatic and geological factors involved in soil formation. The relationship of these factors to the kinds of soils formed in the United States is discussed.

3 class hours. Credit, 3.
Mr. EVERSON.

77. (I) CROP IMPROVEMENT.—Theory and practice of the improvement of field crops by breeding and selection.

2 class hours; 1 2-hour laboratory period. Credit, 3.

Hours by arrangement. THE DEPARTMENT.

Prerequisites, Agronomy 51, Pomology 52, Zoology 53.

78. (II) **FERTILIZERS AND SOIL FERTILITY.**—The primary purpose of this course is to relate soils and fertilizers to plant growth. Studies are made of fertilizer practices in the United States and Europe. In the early part of the course consideration is given to the history of fertilizer development, with special emphasis upon early discoveries and causes of failure in early research. Later in the course, studies are made of factors which relate fertilizers and soils to plant growth. Fertilizer formulation technology and practice are considered in detail in the laboratory phase of this course.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Mr. EVERSON.

79. (I) **SOIL PHYSICS.**—For seniors specializing in agronomy. The factors in soil which control tilth and energy relationships and the laws of physics which govern these factors are discussed. This includes heat, light, color, particle size and charge, water and gas movement, energy relationships and other physical factors effecting changes in the soil. The laboratory is used to familiarize the students with various methods used in measuring these important physical factors.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. EVERSON.

81. (I) 82. (II) **SPECIAL PROBLEMS IN AGRONOMY.**—For seniors specializing in agronomy. This course is designed to acquaint students with agronomic research methods and practical agronomic procedures.

3 2-hour laboratory periods.

Credit, 3.

Mr. COLBY.

84. (II) **SOIL CHEMISTRY.**—For plant science and soil science students. Fundamental inorganic, organic, and biochemical reactions of soils are discussed and related to plant nutrition and microbiological activities. Colloidal aspects of soil chemical reactions and soil-plant interrelationships will be studied.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites; Chemistry 29; Botany 68; Agronomy 57.

84B. (II) **SOIL CHEMISTRY LABORATORY.**—Primarily for seniors majoring in agronomy. Methods and techniques used in soil chemistry research and in plant science investigations will be studied. The student will be made familiar with methods of determining exchangeable bases, base exchange capacity, soil phosphate fractionation, and many other determinations peculiar to soil investigations. To be taken concurrently with Agronomy 84.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisites, Chemistry 29, 30; Botany 68; Agronomy 57.

Agrostology.

53. (I) AGROSTOLOGY.—All factors that influence the successful growing of fine turf grasses are studied and correlated to enable the student to have a practical working knowledge of the construction and maintenance of lawns, sports, highway, airport and cemetery turf.

2 class hours; 1 2-hour laboratory period. Credit, 3.

Mr. DICKINSON.

56. (II) AGROSTOLOGY.—This course considers fine turf management as a business and profession. Emphasis is placed on diagnosis and treatment of turf failures; the selection of equipment and supplies and client approach. Field trips and practical exercises are arranged.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. DICKINSON.

ANIMAL HUSBANDRY

Professor RICE, Associate Professor FOLEY, Associate Professor HALE,† Assistant Professor TIMBERLAKE, Mr. ELLIOT, Mr. MITCHELL, Mr. CHADWICK.

1. (I) AGRICULTURE.—This course is designed to provide the student with a perspective of the whole field of agriculture, both in the old and the new world. It will endeavor to orient the student relative to the position of agriculture in relation to other primary and secondary industries and to personal and professional services. The course will introduce the student briefly to some of the physical characteristics, economic elements, social and political factors concerned with agricultural pursuits and rural living. It will attempt to assist the student in finding his or her proper niche in the broad field of agriculture.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 M. or F. Mr. FOLEY.

26. (II) BREEDS OF LIVESTOCK AND DAIRY CATTLE JUDGING.—This course considers the economic desirability of thirty breeds of domestic livestock. The origin, history, characteristics and distribution of the breeds of cattle, sheep, swine, and horses commercially important in the United States will be discussed.

2 class hours; 1 2-hour laboratory period. Credit, 3.

11:00-11:50 Tu. Th.; 3:00-4:50 F. Mr. ELLIOT.

26A. (II) JUDGING DAIRY CATTLE.—This is an intensive course in judging dairy cattle and is required of animal husbandry majors. Others may take only by instructor's permission. During April and May, trips to leading dairy cattle

† On leave of absence

breeding farms will be made on Saturdays. The highest ranking students will represent the University in the Inter-collegiate Dairy Cattle Judging contest at the Eastern States Exposition and the Dairy Cattle Congress at Waterloo, Iowa the following fall.

1 2-hour laboratory period, February and March, 3-5 Th.

1 4-8 laboratory period, April and May, Saturday.

Credit, 1.

Mr. ELLIOT.

51. (I) NUTRITION OF FARM ANIMALS.—This course will present the fundamental principles of animal nutrition together with the identification, composition, properties and uses of the common feed stuffs. The application of these basic principles in calculating balanced rations for all classes of livestock will be stressed, followed by practical feeding problems assigned outside the classroom. Feeding practices in use with the university livestock will be analyzed and demonstrated.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

8:00-8:50 M. W. F.; 3:00-4:50 W.

Mr. ELLIOT.

53. (I) ELEMENTS OF MEAT PACKING.—For department majors only. The lectures will discuss the development of the modern packing industry, the history of meat inspection, the principles of meat preservation and the opportunities in this field. Laboratories include the classification of cattle, calves, and swine into proper market classes and grades and slaughtering and dressing operations with animals provided by the university farm. Wholesale and retail cuts are prepared. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-1:50 W.; 1:00-2:50 or 3:00-4:50 M. F.

Mr. HALE.

54. (II) MEAT PROCESSING.—For students not majoring in animal husbandry, by permission of the instructor. A few periods will be devoted to a discussion of the meat packing industry and to the preserving and care of meat products. The remainder will be spent on the classification of meat animals with practice slaughtering and the making of wholesale and retail cuts with stress on identification of retail cuts. A one-day trip through the packing plants of Boston is a requirement of his course and will cost about ten dollars.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 Tu. Th.

Mr. HALE.

56. (II) BEEF AND SHEEP PRODUCTION.—This course considers the historical and economic development, present status and probable future trends of beef and sheep production in the United States, especially New England. Consideration will be given to types of production; systems and methods of

feeding, management and marketing. In the laboratory, practice will be obtained in fitting and showing as well as certain practical techniques such as dehorning, ear-tagging, castrating, foot-trimming, shearing, etc., and the treatment and prevention of external and internal parasites as well as common ailments.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 3:00-4:50 M. or F. Mr. TIMBERLAKE.

56A. (II) GENERAL LIVESTOCK JUDGING AND FIELD TRIPS.—This course is given in conjunction with Animal Husbandry 56 and consists of practice in judging and selecting beef, cattle, sheep, horses, and swine. Throughout the spring, field trips are made to nearby livestock farms and breeding establishments. The five highest ranking students in judging will represent the university in the Intercollegiate Livestock Judging Contest at Eastern States Exposition the succeeding fall.

1 4-hour laboratory period. Credit, 1.
8:00-12:00 S. Mr. TIMBERLAKE.

72. (II) MEAT JUDGING.—This course deals with the classification, grading and judging of carcasses and cuts of beef, veal, lamb and pork. Class work will be carried on at Amherst and nearby packing and distributing plants. The team to represent the university in the Intercollegiate Meat Judging Contest held in connection with the Eastern States Exposition will be chosen from students in this course.

1 4-hour laboratory period. Credit, 1.
1:00-4:50 Tu. Mr. HALE.

Prerequisites, Animal Husbandry 51 and 53 or permission of instructor.

74. (II) ADVANCED MEATS.—This course deals with the advanced techniques in preparing, preserving, and utilizing the various meat products from cattle, sheep and swine.

2 2-hour laboratory periods. Credit, 2.
Mr. HALE.

Prerequisite, Animal Husbandry 53 and 54 and permission of instructor.

75. (I) ANIMAL BREEDING.—This course is planned to acquaint the student with the facts of reproductive physiology, with the facts and theories of modern genetics, and to show how such knowledge may be utilized through genetic analysis, selection, and systems of breeding for the creation of more beautiful and more efficient animal types.

3 2-hour periods. Credit, 4.
1:00-2:50 M. W. F. Mr. RICE.

Prerequisite, Zoology 53.

76. (II) ANIMAL BREEDING TECHNIQUES.—This course deals with the practical application of the principles of physiology of reproduction and selection to the improvement of

farm animals. It includes practice in semen collection and evaluation, artificial insemination procedures and techniques, and in the study of genitalia at different stages of estrus and gestation periods in live and dead animals. Methods of easing and aiding parturition will be discussed and observed.

1 2-hour laboratory period

Credit, 1.

3:00-4:50 Tu. or Th.

Mr. ELLIOT.

78. (II) DAIRY CATTLE PRODUCTION.—This is an intensive course covering all phases of dairy cattle and milk production. It affords an opportunity to seek the solution to the economic, nutritional, genetic, and managerial problems concerned in successful dairying.

4 2-hour laboratory periods.

Credit, 4.

8:00-9:50 Tu. Th.; 1:00-2:50 W., and Tu. or Th. Mr. FOLEY.

79. (I) HORSE AND SWINE PRODUCTION.—This course is the same as Animal Husbandry 56 except that it deals with horses and swine instead of beef and sheep.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu. Th.; 3:00-4:50 M. or F.

Mr. TIMBERLAKE.

79A. (I) ADVANCED LIVESTOCK JUDGING.—This course is devoted entirely to beef, sheep, horse, and swine judging and selection. Field trips will be made to breeding establishments and a team will be selected to represent the University at the Intercollegiate Livestock Judging Contest at the International Livestock Exposition in Chicago and at any other contests in which the University may occasionally or regularly participate.

1 4-hour laboratory period, first half of semester.

Credit, 1.

8:00-12:00 S.

Mr. TIMBERLAKE.

Prerequisite, Animal Husbandry 56A or permission of instructor.

81. (I) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 W. or Th.

Mr. FOLEY.

82. (I) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 Tu. or Th.

Mr. RICE.

83. (I) ADVANCED MEAT JUDGING.—This course is a continuation of Course 72. The team to represent the University in the Intercollegiate Meats Judging Contest held in connection with the International Livestock Exposition will be chosen from students in this course.

1 4-hour laboratory period, first half of semester.

Credit, 1.

1:00-4:50 Tu.

Mr. HALE.

Prerequisite, Animal Husbandry 72 and permission of instructor.

91. (I) GENETICS AND EUGENICS.—This course, open to students other than those specializing in animal husbandry, deals with the general problems concerned in human reproduction and inheritance. The main topics studied will consist of the physiology of reproduction, the physical basis of inheritance, and the mode of transmission of human characteristics. Consideration will also be given to such questions as the causes of variation, the relative importance of genetic and environmental influences, the mechanism of sex determination as well as population trends, differential birth rates, sterilization, and kindred eugenic problems.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. RICE.

BACTERIOLOGY AND PUBLIC HEALTH

Professor BRADLEY†, Associate Professor GARVEY, Professor FRANCE, Associate Professor PERRIELLO, Assistant Professor CZARNECKI, Assistant Professor ROBERTSON, Mr. MANDEL, Mr. LARKIN in cooperation with Dr. WALTER W. LEE, State District Health Officer; Mr. ERNEST A. SNOW of the Division of Sanitary Engineering of the Massachusetts Department of Public Health.

31. (I) and (II) INTRODUCTORY BACTERIOLOGY.—Designed to present to students interested in general science, agriculture, horticulture, and home economics the fundamental concepts of bacteriological science; make microorganisms real and significant; and demonstrate their importance in the problems of agriculture, general science, industry, public health, and medicine. The laboratory work covers the use and care of the compound microscope, the preparation of culture media, methods of sterilizing equipment, the isolation and aseptic handling of pure cultures, simple and differential staining, bacterial classification and differential studies on type species of pathogenic and non-pathogenic bacteria.

2 class hours; 2 2-hour laboratory periods.

Credit, 4.

12:00-12:50 M. F. or Tu. Th.; 1:00-2:50 or 3:00-4:50 M. F. or Tu. Th. Mr. CZARNECKI, Mr. FRANCE, or Mr. LARKIN.

51. (I) 52. (II) ADVANCED BACTERIOLOGY.—A continuation of introductory bacteriology. Studies on bacterial metabolism and the influence of environmental factors on growth and viability. The identification and differentiation of bacterial species by morphological, cultural, physiological, and serological studies; disinfectants and antibiotics. The combined courses give to the student not only a comprehensive picture of various forms of existing bacteria but develop a

† On leave of absence.

specialized technique for their cultivation, isolation, and identification.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 Tu. Th.

MISS GARVEY.

Prerequisite, For 51, Bacteriology 31A; for 52, Bacteriology 51.

54. (I) and (II) WATER AND SEWAGE BACTERIOLOGY.—For students majoring in Engineering. Elementary bacteriology with emphasis placed upon the importance of bacteria found in water and sewage. Work will include routine analysis used in the examination of water and sewage and in the laboratory control of water and sewage treatment plants.

2 3-hour laboratory periods.

Credit, 3.

2:00-4:50 Tu. Th.

MR. PERRIELLO.

Prerequisite, Civil Engineering 77 or permission of the instructor.

55. (I) FUNDAMENTALS OF SOIL MICROBIOLOGY.—This course is designed for students majoring in agricultural and related fields. Subjects included will be: fundamental laboratory procedures and techniques; quantitative and qualitative microbiological analysis of various types of soils; studies on the carbon and nitrogen cycles as affected by soil microorganisms.

2 3-hour laboratory periods.

Credit, 3.

MR. FRANCE.

56. (I) and (II) METHODS FOR BACTERIOLOGICAL PREPARATIONS.—This course is intended for students majoring in bacteriology and public health. The material given in the course includes methods of preparation and sterilization of culture media and equipment, the preparation of stains and reagents, and the use, care and repair of laboratory instruments.

2 2-hour laboratory periods.

Credit, 2.

THE STAFF.

81. (I) GENERAL APPLIED BACTERIOLOGY.—This course is designed to give the student a working knowledge of routine and special tests used in present day applied bacteriology. Subjects receiving consideration are: methods for determining the sanitary quality of milk and milk products, water and shellfish; eating and drinking utensils; and air.

1 class hour; 2 3-hour laboratory periods.

Credit, 4.

1:00-3:50 M. F. or 1:00-3:50 W.; 9:00-11:50 S.

MR. FRANCE.

Prerequisite, Bacteriology 51 or permission of the instructor.

82. (II) FOOD BACTERIOLOGY.—Consideration will be given to (1) bacteriological principles which apply to the preservation, fermentation and spoilage of foods, (2) the

sanitary examination of foods, (3) the causes of food poisoning, and (4) microbiological assays.

2 3-hour laboratory periods. Credit, 3.
1:00-3:50 M. F. or Tu. Th. MISS GARVEY.

Prerequisite, Bacteriology 51 or permission of the instructor.

85. (I) BACTERIOLOGY (IMMUNOLOGY).—Admission by permission of the instructor. This course includes consideration of host reactions which favor the prevention and cure of disease; qualitative and quantitative estimations of toxins and antitoxins; the use of biological products such as antigens and immune sera in differential bacteriology and in disease diagnosis; and a consideration of isohemagglutinins as determinants of blood groups.

2 3-hour laboratory periods. Credit, 3.
1:00-3:50 M. F. Miss GARVEY.

90. (II) SANITARY BACTERIOLOGY.—A detailed study of public health laboratory methods. Practical application of methods will be made through field studies.

1 4-hour and 1 2-hour laboratory period. Credit, 3.
1:00-4:50 M., 1:00-2:50 F. Mr. FRANCE.

Prerequisite, Bacteriology 81.

92. (II) CLINICAL LABORATORY METHODS.—This course is designed for students majoring in medical technology. The purpose of the course is to familiarize the student with routine clinical laboratory procedures.

1 4-hour laboratory period. Credit, 3.
1:00-4:50 W., 3:00-4:50 F. Mr. FRANCE.

Prerequisites, Bacteriology 85; Zoology 35, 69.

93. (I) 94. (II) PROBLEMS.—Qualified seniors who have obtained permission from the department may arrange for independent work on special problems in bacteriology.

Credit, 3.
THE DEPARTMENT.

Public Health

61. (I) 62. (II) GENERAL AND COMMUNITY SANITATION.—A study of the problems of general and community sanitation. Subjects discussed will include insect and rodent control, housing and slum clearance, ventilation, lighting, bathing places, sanitation of eating utensils, nuisances, camp sanitation industrial hygiene, water supplies, sewerage and sewage, refuse and garbage, food and milk sanitation.

3 class hours. Credit, 3.
9:00-9:50 Tu. Th., 12:00-12:50 F. or 10:00-10:50 M. W. F.

Mr. ROBERTSON or Mr. PERRIELLO.

63. (I) **INDUSTRIAL HYGIENE AND SANITATION.**—A comprehensive study of the practices and principles of industrial processes which may constitute problems in sanitation; industrial wastes, smoke abatement, and the health of the worker. Subject matter includes organization of programs and the formation of policies for the inspection of sanitary and mechanical facilities of factories, food processing plants and other industries.

3 class hours.

Credit, 3.
Mr. PERRIELLO.

64. (II) **MICROSCOPY OF WATER.**—A study of microscopic forms of life exclusive of the bacteria. Counting and control of plankton in potable waters. Elements of limnology.

2 class hours; 1 2-hour laboratory period.

9:00-9:50 M. F.; 8:00-9:50 or 10:00-11:50 W. Credit, 3.
Mr. SNOW.
Prerequisite, Bacteriology 31A.

66. (I) and (II) **PRINCIPLES OF SANITATION.**—The application of sanitary engineering and related sanitary sciences to health problems in the environment of urban and rural communities.

2 class hours.

11:00-11:50 Tu. Th.

Credit, 2.
Mr. PERRIELLO.
Prerequisite, Civil Engineering, 77 or permission of the instructor.

84. (II) **PUBLIC HEALTH ADMINISTRATION.**—Admission by approval of the instructor. The organization, function, and administration of governmental health agencies; the relationship of official and volunteer health agencies; preparation and presentation of lectures, demonstrations, and exhibits. Public health laws, regulations, and sanitary codes, their origin and enforcement.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. PERRIELLO.

86. (II) **FIELD STUDIES IN SANITATION.**—Trips will be taken into the field for the observation of public health practices in sewerage; sewage treatment and disposal; the production and purification of public water supplies; housing and slum clearance; insect and rodent nuisances; milk production, handling, and distribution; garbage and refuse collection and disposal; slaughter houses and rendering plants; cold storage warehouses; and bakery and restaurant sanitation. A comparative study of urban and rural services will be made. Although transportation will be furnished, students are expected to finance their own meals.

1 class hour; 1 4-hour laboratory period.

Hours by arrangement.

Prerequisites, Public Health 61 and 62.

Credit, 2.
Mr. ROBERTSON.

88. (II) EPIDEMIOLOGY AND COMMUNICABLE DISEASE CONTROL.—Admission by approval of the instructors. Consideration of the factors involved in the spread of infections; a detailed discussion of the communicable diseases, their distribution, cause, epidemiology, and means of prevention and control. The use of vaccines, serums and drugs for prevention and treatment. Mass immunization programs.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

Mr. LEE.

BOTANY

Professor KOZLOWSKI, Professor TORREY, Associate Professor LIVINGSTON, Assistant Professor BANFIELD, Assistant Professor SPENCER, Mr. PUTULA, Mr. SCARBOROUGH.

1. (I) and (II) INTRODUCTORY BOTANY.—The course sets forth a body of facts dealing with the morphology and physiology of plants which is not only a foundation for future professional work in biological science, but of intrinsic value to the educated layman. The topics of seed germination, ecological adaptations, floral structures, taxonomy, botanical history, cytology, wood-anatomy, plant physiology, and plant reproduction receive appropriate elementary treatment. The lectures attempt to interpret the facts of plant structure and function in the light of the major biological principles.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. LIVINGSTON.

25. (I) THE PLANT KINGDOM.—Selected forms typifying the slimemolds, bacteria, algae, fungi, lichens, liverworts, mosses, fernworts, and seed plants. The course has a two-fold purpose: (1) it is intended for students who desire to extend their knowledge to the principal branches of the plant kingdom, thus rounding out a general course of which Botany 1 constitutes the first part; (2) it is also planned as an introduction to certain advanced courses for which it is prerequisite.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. TORREY.

Prerequisite, Botany 1.

26. (II) SPRING FLORA.—Designed primarily to acquaint the student with the local spring flora through the identification of the commoner tracheate plants (lycophytes, horsetails, ferns, gymnosperms, angiosperms) and the families they represent. In addition, laboratory and field work will include the study of native woody plants in the winter condition; the techniques of collection; the use of a standard manual in the identification of plants; and the preparation of a representative herbarium. The course is designed for students majoring in botany, forestry, floriculture, recreational leadership, and

wildlife management. Enrolment limited to 40. Expense of required materials approximately \$20.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
8:00-8:50 W.; 1:00-2:50 Tu. Th. or 1:00-2:50 M. F.

Mr. LIVINGSTON.

Prerequisite, Botany 1; Botany 25 recommended.

28. (II) PLANT PHYSIOLOGY.—Only for students intending to major in forestry. The processes occurring in plants with special emphasis on tree physiology and its relation to forestry problems.

2 class hours; 1 2-hour laboratory period. Credit, 3.

Mr. KOZLOWSKI.

51. (I) PLANT PATHOLOGY.—A basic course in plant pathology dealing with the nature, cause and control of plant disease. Particular attention is given to disease symptoms, the phenomena of infection and of parasitism, the sources of inoculum, the agents of disease transmission, the relation of environment to disease incidence and development and to general principles of plant disease control. The laboratory phase is devoted to intensive study of a relatively few representative diseases induced by bacteria and fungi of the various classes.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
9:00-9:50 W.; 3:00-4:50 Tu. Th.

Mr. BANFIELD.

52. (II) ADVANCED PLANT PATHOLOGY (1954-55).—An extension of Course 51. The objective is that of providing the student with a general knowledge of the more common and representative plant disease problems. Students are granted the option in the laboratory of specializing in disease problems in their major field of interest. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
9:00-9:50 W.; 3:00-4:50 Tu. Th.

Mr. BANFIELD.

Prerequisite, Botany 51.

53. (I) FALL FLORA.—This course, a continuation of Botany 26, is designed for those students in the several fields of natural history who desire a fuller knowledge of the local flora than can be gained in the Spring. Emphasis will be placed on the identification of important families and species of flowering plants of the late summer and fall and on the thorough use of Gray's Manual of Botany. Primarily a field and laboratory course. The first part of the semester will be devoted to intensive collecting in the field followed by identification of these collections in the laboratory.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. LIVINGSTON.

Prerequisite, Botany 26.

58. (II) MICROTECHNIQUE.—A course in the preparation of microscopic mounts including the celloidin and paraffin methods and involving the use of microtomes and of differential stains. Enrolment limited to ten students.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 Tu. Th.

Mr. TORREY.

Prerequisite, Botany 25.

59. (I) 60. (II) THE ANGIOSPERMS (1954-55).—Alternate with Courses 61 and 62. The angiosperms are here treated from the standpoints of their structure and evolution, their taxonomy, their habits and distribution, and their economic or other special appeal to man's interests. Representatives of the dominant families, both temperate and tropical, are studied in the laboratory. The course is designed for students who want a broad knowledge of the flowering plants of the world.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. TORREY.

Prerequisite, Botany 1.

61. (I) 62. (II) THE COMPARATIVE ANATOMY OF GREEN PLANTS (1953-54).—Alternate with Courses 59 and 60. The first semester is devoted to algae and mosses; the second to tracheates, including the extinct forms.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. F.; 1:00-2:50 W.

Mr. TORREY.

Prerequisite, Botany 25.

63. (I) COMPARATIVE MORPHOLOGY OF FUNGI—BASIDIOMYCETES AND FUNGI IMPERFECTI (1954-55).—The lectures deal with the comparative morphology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 F.; 3:00-4:50 M. F.

Mr. BANFIELD.

64. (II) COMPARATIVE MORPHOLOGY OF FUNGI—PHYCOMYCETES AND ASCOMYCETES (1953-54).—The lectures deal with the comparative morphology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu.; 10:00-10:50 Th.; 3:00-4:50 M.

Mr. BANFIELD.

66. (II) GENERAL MYCOLOGY.—A survey course in mycology designed to acquaint the student with the various

classes of fungi, the life history and morphology of representative species, their distribution in nature, their significance in plant and animal disease, their utilization in industrial fermentations. The laboratory phase is devoted to a study of common representative forms and practice in the use of keys for their identification.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th: Mr. BANFIELD.

67. (I) 68. (II) INTRODUCTORY PLANT PHYSIOLOGY.—A study of the processes occurring in plants and their relation to the complex of activities constituting plant growth. Topics include colloidal systems, osmotic phenomena, absorption, transpiration, and internal water relations of plants, photosynthesis, fat and protein synthesis, digestion, translocation, respiration, and growth. This is a basic course for students planning for advanced work in any branch of plant science.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 W.; 3:00-4:50 M. W. or Tu. Th.

Mr. KOZLOWSKI.

75. (I) METHODS IN PLANT PATHOLOGY (1954-55).—A course in the general techniques and specialized methods used in the investigation of plant diseases, including isolation, culture and pathogenicity studies of representative plant pathogens, the preparation and sterilization of various culture media, elementary staining and histological techniques, the use of the microscope, study of fungicides, and training in elementary photographic procedures. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
2:00-2:50 Tu.; 10:00-11:50 Tu.; 3:00-4:50 F. Mr. BANFIELD
Prerequisite, Botany 51.

77. (I) 78. (II) ADVANCED PLANT PHYSIOLOGY (1953-54)
—Advanced study in physiology. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Hours by arrangement. Mr. KOZLOWSKI
Prerequisites, Botany 67, 68; Chemistry 51, 52.

81. (I) PLANT ECOLOGY.—A general survey of the relationship of plants to their environment including a study of environmental factors (autecology)—soil, water, temperature, light, atmosphere, and the biotic factors—and of plant communities (synecology) with special emphasis on the structure and succession of plant communities in North America.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. LIVINGSTON.
Prerequisite, Botany 1; Botany 26 recommended.

82. (II) PLANT GEOGRAPHY.—A survey of descriptive and historical plant geography as well as the basic principles governing the natural distributions of plants. Included as topics are problems of dispersal and migration, endemism, species senescence, discontinuous distributions, polyphesis, continental drift, and geographical aspects of polyploidy. The course is designed for advanced undergraduates or qualified graduate students.

2 class hours.

Credit, 2.

Mr. LIVINGSTON.

Prerequisite, Botany 81 or equivalent recommended.

85. (I) 86. (II) PROBLEMS IN BOTANY.—Supervised problem work for qualified students.

Hours by arrangement.

Credit, 1-3.

THE STAFF.

88. (II) PLANT CYTOGENETICS.—The interpretation of hereditary phenomena in plants in terms of cell structures. A correlation of plant cytology and genetics which is of applied as well as theoretical importance.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Prerequisite, Zoology 35 or equivalent.

Mr. SPENCER.

90. (II) INSECT TRANSMISSION OF PLANT DISEASES.—The intricate interrelationships of insects and microorganisms with particular emphasis on the basic role played by insects in inception, distribution and perpetuation of plant diseases.

3 class hours.

Credit, 3.

Mr. BANFIELD.

BUSINESS ADMINISTRATION

Professor KIMBALL, Professor HARDY, Associate Professor COLWELL, Associate Professor VANCE, Assistant Professor SMART, Assistant Professor, SCHEMPF, Assistant Professor SINGER, Assistant Professor LUDTKE, Mr. RIVERS, Mr. HEFNER, Mr. LENTILHON.

Accounting.

25. (I) INTRODUCTION TO ACCOUNTING.—This course aims to give the student a working knowledge of the principles underlying the gathering, recording, and interpretation of accounting data.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. COLWELL, Mr. HEFNER, Mr. SINGER.

26. (II) INTRODUCTION TO ACCOUNTING, II.—This course covers the principles and procedures of corporation accounting and is an introduction to valuation, accounting for consignment and installment sales, and statement interpretation.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. COLWELL, Mr. SINGER

61. (I) INTERMEDIATE ACCOUNTING.—An application of accounting principles to problems of income determination and the classification and valuation of assets.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. SMART.

Prerequisite, Accounting 26.

62. (II) ADVANCED ACCOUNTING.—A continuation of Accounting 61, concerned with the valuation of assets and liabilities, accounting for net worth, statements of application of funds and the analysis of financial statements.

1 class hour, 2 2-hour laboratory periods.

Credit, 3.
Mr. SINGER.

Prerequisite, Accounting 61.

63. (I) COST ACCOUNTING.—The use of accounting techniques to determine business costs, including process costs, standard costs, distributive costs and cost problems imposed by government regulation.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. SINGER.

Prerequisite, Accounting 26.

74. (II) SYSTEMS AND TAX ACCOUNTING.—The application of accounting procedures to representative types of business and the study of Federal Income Tax accounting problems.

1 class hour; 2 2-hour laboratory periods.

Prerequisite, Accounting 63.

Credit, 3.
Mr. COLWELL.

75. (I) ADMINISTRATIVE ACCOUNTING AND CONTROL.—The preparation and analysis of budgets, reports, and internal checks, using accounting techniques and data, as control devices in business and industry.

3 class hours.

Prerequisite, Accounting 26.

Credit, 3.
Mr. COLWELL.

76. (II) AUDITING.—A course in the interpretation of accounting records dealing with audit theory and procedure. C.P.A. and American Institute of Accountants examination problems are studied.

1 class hour; 2 2-hour laboratory periods.

Prerequisites, Accounting 62 and 63.

Credit, 3.
Mr. COLWELL.

Finance

53. (I) FINANCIAL INSTITUTIONS.—A general course which surveys the development and operations of our financial institutions and provides an integrated study of the entire American financial structure.

3 class hours.

Credit, 3.
Mr. KIMBALL, Mr. LUDTKE.

65. (I) CORPORATION FINANCE.—This course in business finance is concerned with forms of ownership organization, the nature and uses of corporate securities, provision and maintenance of capital, financial expansion, and corporate reorganization.

3 class hours.

Credit, 3.

Mr. KIMBALL, Mr. LUDTKE, Mr. RIVERS.

76. (II) INSURANCE.—A general course concerning risks to which individuals and business enterprises are exposed and the methods and institutions evolved to insure against loss. Property, casualty, life and other forms of insurance are studied from the point of view of both the insurance carrier and the insured.

3 class hours.

Credit, 3.

Mr. LUDTKE.

81. (I) PROBLEMS IN BUSINESS FINANCE.—A study of problems of financial management of business corporations and the effects of financial policies on the individual firm and the economy as a whole.

3 class hours.

Credit, 3.

Mr. KIMBALL.

Prerequisite, Finance 65 or consent of instructor.

82. (II) INVESTMENTS.— The principles and techniques that are useful for the analysis and selection of investment media; investment policies of individuals and institutions.

3 class hours.

Credit, 3.

Mr. LUDTKE.

Prerequisite, Finance 65 or consent of instructor.

Business Law

70. (I) and (II) BUSINESS LAW I.—This course consists of a study of the drawing, reading, and interpretation of contracts, and includes agency, sales, and commercial paper.

3 class hours.

Credit, 3.

Mr. SMART.

72. (II) BUSINESS LAW II.—A continuation of Business Law 70 including the study of the legal aspects of business organization and the laws of public regulation.

3 class hours.

Credit, 3.

Mr. SMART.

Prerequisite, Business Law 70.

Industrial Administration

11. (I) INDUSTRIAL GEOGRAPHY.—A study of the industrial distribution of natural and human resources and the industrial and physiographic bases of the extractive and manufacturing industries.

3 class hours.

Credit, 3.

Mr. VANCE, Mr. RIVERS.

63. (I) MANAGEMENT IN INDUSTRY.—A study of the problems connected with the organization and management of manufacturing enterprises.

3 class hours.

Credit, 3.
Mr. VANCE.

66. (II) TRANSPORTATION AND TRAFFIC.—The development of highway, waterway, railway, and air transportation; the operation and control of transportation agencies; the use of freight tariffs, classifications and routing guides; the functions of industrial traffic departments.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. RIVERS.

84. (I) PERSONNEL MANAGEMENT.—A study of the principles of the management of labor relations. Attention is focused on procuring, developing, maintaining and using personnel.

3 class hours.

Credit, 3.
Mr. VANCE.

Marketing

53. (I) MARKETING PRINCIPLES AND PROBLEMS.—Not open to students who have taken or are taking Agricultural Economics 55. A study of the forces and conditions which determine prices and the mechanism, methods, and problems concerned with transporting, storing and distributing economic goods.

3 class hours.

Credit, 3.
Mr. HARDY, Mr. SCHEMP.

54. (II) SALESMANSHIP AND SALES MANAGEMENT.—The principles and practices of selling; the management of sales personnel; and the control of sales operations.

3 class hours.

Credit, 3.
Mr. HARDY.

56. (II) PURCHASING.—An intensive study of the purchasing problems of industrial enterprises and their market contacts with their sources of supply.

3 class hours.

Credit, 3.
Mr. SCHEMP.

71. (I) RETAIL MERCHANDISING.—A study of the operation and productive functions of the business of retailing.

3 class hours.

Credit, 3.
Mr. SCHEMP.

72. (II) MARKET RESEARCH.—The aims, sources and fact-gathering methods of market research activities. General study and individual research projects.

3 class hours.

Credit, 3.
Mr. SCHEMP.

73. (I) ADVERTISING.—A study of the techniques and media of advertising, its services to business and the organization and economic functions of the advertising industry.

3 class hours.

Credit, 3.

Mr. HARDY.

74. (II) NEW ENGLAND MARKETS.—Individual and group study of the marketing problems of New England industrial and marketing enterprises.

3 class hours.

Credit, 3.

Mr. HARDY.

FIELD WORK IN MERCHANDISING.—Open only to students in the Merchandising curriculum who have been assigned to supervised field work positions. Grades are based upon a report from the student's employer and a formal written report presented by the student. No academic credit is given for this course.

Mr. HARDY.

CHEMISTRY

Professor RITCHIE, Professor FESSENDEN, Professor SMITH, Assistant Professor CANNON, Associate Professor LITTLE, Assistant Professor RICHASON, Assistant Professor ROBERTS, Assistant Professor STEIN, Dr. PARROTT*, Mr. CRUICKSHANK†, Mr. OBERLANDER, Mr. HALL, Mr. RHYNE, Mr. SCHAFFRATH, Mr. TYLER, Mr. SCHEUFELE, Mr. SHENIAN, Mr. CHRISTOFFERS.

1. (I) 2. (II) GENERAL CHEMISTRY.—A study of the fundamental chemical laws and theories. A considerable amount of descriptive material will be included in connection with discussions of the periodic system, atomic structure, and in various applications of the principles. The object of the course is to give the student a sound scientific training through a course in chemistry. Students who have had no previous work in chemistry will be grouped together in laboratory and recitation sections so that they may have special attention.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

Mr. FESSENDEN, Mr. RICHASON, Mr. OBERLANDER.

4. (II) GENERAL INORGANIC CHEMISTRY.—For students planning to major in chemistry or chemical engineering, and others who plan to continue the study of this science in preparation for their field of specialization. The course will include ionic equilibria; oxidation and reduction; electrochemistry; the descriptive chemistry of some nonmetallic

† On leave of absence.

* On leave of absence for military service.

and metallic elements; the metallurgy of some common metals, and a discussion of the production of some of the more important inorganic chemicals. Applications of atomic structure and the electronic theory of valence to these subjects will be stressed.

2 class hours; 1 quiz hour; 2 2-hour laboratory periods.

Credit, 4.

Mr. FESSENDEN, Mr. RICHASON.

Prerequisite, Chemistry 1.

29. (I) and (II) QUALITATIVE ANALYSIS.—A study of the fundamental principles and laws concerning the behavior of solutions of electrolytes. The laboratory work deals with the characteristic properties, reactions, and the systematic separation and identification of the common cations and anions. The semi-micro technique is used throughout for the analysis of salts, salt mixtures, and alloys. A considerable portion of the laboratory work is devoted to the identification of substances unknown to the student. This course is designed to meet the needs not only of those students specializing in chemistry, but also of those students specializing in other subjects where inorganic chemistry is of importance.

2 class hours; 6 laboratory hours.

Credit, 4.

8:00-8:50 or 10:00-10:50 Tu. Th.; 8:00-9:50 or 10:00-11:50 M.

W. F. or 1:00-3:50 M. F. or 1:00-3:50 Tu. Th.

Mr. SMITH.

Prerequisite, Chemistry 2.

30. (I) and (II) QUANTITATIVE ANALYSIS.—The theory and practice of representative determinations, both gravimetric and volumetric. The laboratory work will include the gravimetric analysis of chloride, sulfate, and limestone, volumetric work with acids and bases, volumetric precipitation methods, and oxidation reduction titrations.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 Tu. Th.; 1:00-3:50 M. F. or Tu. Th. or 1:00-3:50

W.; 9:00-11:50 S.

Mr. ROBERTS.

Prerequisite, Chemistry 29.

33. (I) ORGANIC CHEMISTRY.—A short course intended to satisfy the requirements in this field for all students who do not specialize in chemistry.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

9:00-9:50 Tu. Th. S.; 1:00-3:50 M. T. W. or Th.

Mr. SCHAFFRATH.

Prerequisites, Chemistry 1 and 2.

51. (I) 52. (II) ORGANIC CHEMISTRY.—A course in the theory of organic chemistry intended to serve the needs of students who will specialize in chemistry, as well as those

who may specialize in other fields where a more comprehensive course is desired than Chemistry 33. The first semester deals largely with compounds of the aliphatic series, while the benzene series is taken up in the second semester. Students electing this course should take both 51 and 52.

3 class hours; 1 3-hour laboratory period. Credit, 4.
9:00-9:50 M. W. F.; 1:00-3:50 M. W. or F.

Mr. RITCHIE, Mr. CANNON.

Prerequisite, Chemistry 29.

63. (I) CHEMISTRY OF WATER, SEWAGE AND SEWAGE SLUDGE.—Admission by permission of the instructor. The preparation of reagents and standard methods for the analysis of water, sewage and sewage sludge. Lectures and discussions on the sanitary significance of analytical data.

2 3-hour laboratory periods. Credit, 3.
1:00-3:50 W.; 9:00-11:50 S.

Mr. SNOW.

Prerequisite, Chemistry 30.

65. (I) 66. (II) PHYSICAL CHEMISTRY.—A study of the fundamental theories and laws of physical chemistry, together with the solution of problems involved in their application. The laboratory work will include practice in making physico-chemical measurements and the preparation of reports.

3 class hours; 1 3-hour laboratory period. Credit, 4.
8:00-8:50 or 11:00-11:50 M. W. F.; 1:00-3:50 M. W. or F.

Mr. FESSENDEN, Mr. SMITH.

Prerequisites, Chemistry 30; Mathematics 30; Physics 26.

77. (I) ADVANCED PHYSICAL CHEMISTRY.—A detailed study of a number of topics such as kinetics, catalysis, chemical thermodynamics and electrochemistry.

3 class hours. Credit, 3.
Mr. STEIN.

Prerequisites, Chemistry 65 and 66.

79. (I) ELEMENTARY BIOCHEMISTRY.—A consideration of the more important facts relating to biological materials and processes. This course is designed primarily for students not eligible for courses 93 or 94. It is not open to chemistry majors and is not offered for graduate credit.

3 class hours; 1 3-hour laboratory period. Credit, 4.
Mr. LITTLE.

80. (II) CLINICAL CHEMISTRY (Blood and Urine Analysis).—Work to be covered will include the collection and preparation of samples for analysis; standardization of glassware and the preparation of reagents; description of colorimeters and the determination of certain significant compounds in the samples. The latter group will include

at least sugars, proteins, non-protein, nitrogen, fatty substances and inorganic elements.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. LITTLE.

81. (I) ORGANIC CHEMISTRY.—A rapid and intensive survey of the important reactions of organic chemistry with emphasis on their scope and limitations, recent developments and theoretical aspects. Admission by permission of instructor.
3 class hours.

9:00-9:50 Tu. Th. S.

Credit, 3.
Mr. CANNON.

82. (II) QUALITATIVE ORGANIC CHEMISTRY.—The characterization of organic compounds by means of physical properties, class reactions and the preparation of suitable derivatives. The laboratory work will involve the identification of a number of simple unknown compounds followed by the separation, purification, and identification of the individual components in several unknown mixtures of organic compounds.

Admission by permission of instructor.

2 class hours; 2 3-hour laboratory periods.

1:00-1:50 Tu. Th.; 2:00-4:50 Tu. Th.

Credit, 4.
Mr. CANNON.

83. (I) ADVANCED QUANTITATIVE ANALYSIS.—Designed primarily for chemistry majors, but open to others with permission of the instructor. The laboratory work will include representative determinations in electrolytic and electrometric methods; and an introduction to colorimetry and other optical methods of analysis. Selected topics in the use of organic precipitants, silicate analysis, analysis of steel and other alloys, fuels, oils, water, and gases will also be included.
2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. ROBERTS.

Prerequisite, Chemistry 30.

86. (II) THEORETICAL INORGANIC CHEMISTRY.—A survey of inorganic chemistry which is largely theoretical and includes such topics as atomic structure, periodic classification and relationships, valence concepts, acid-base theory, and the chemistry of the commercially important elements and their compounds based upon the periodic table.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.
Mr. SMITH.

Prerequisite, Chemistry 65.

88. (II) HISTORY OF CHEMISTRY.—An historical and biographical study of chemistry and chemists. The aim of the course is: (1) to give the student a comprehensive view of the science as a whole, through a study of the development of new ideas and the establishment of new theories and laws;

and (2) to arouse an enthusiastic interest in the subject and an appreciation of the true spirit of scientific research, through a sympathetic presentation of the work and lives of the great chemists who have been the creators of the chemistry of today.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.

Mr. RITCHIE.

92. (II) INTRODUCTION RESEARCH.—Admission only by permission of the department. The aim of the course is to give the student an opportunity to learn the purpose and methods of research. To each student is assigned some special subject or problem in one of the following fields of chemistry, viz., analytical, biochemical, inorganic, organic, physical.

10 laboratory hours.

Hours by arrangement.

Credit, 5.

THE DEPARTMENT.

93. (I) 94. (II) GENERAL BIOCHEMISTRY.—These courses offer a broad introduction to the general field of biochemistry for students majoring in chemistry or in the biological sciences, and provide a background for more advanced or specialized study in this field.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. LITTLE.

Prerequisites, Chemistry 51 and 52 or their equivalent.

DAIRY INDUSTRY

Professor HANKINSON, Assistant Professor LINDQUIST,
Assistant Professor NELSON, Mr. FINNEGAN.

25. (I) GENERAL DAIRYING.—This course is introductory to all other courses in dairy industry and gives a general knowledge of the subject to those who wish to take only one course in dairying. The lecture portion includes the importance of the dairy industry, the composition and properties of milk, the secretion of milk, production of quality milk on the farm, methods of processing milk and cream, and the elements of ice cream, butter and cheese making. The laboratory work includes the testing of milk and milk products for fat and acidity, lactometry, and a general study of dairy plant equipment and processes.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

1:00-1:50 Tu. Th.; 9:00-10:50 W. or 2:00-3:50 Tu.

Mr. HANKINSON, Mr. FINNEGAN.

50. (II) JUDGING DAIRY PRODUCTS.—A study of market standards and grades of dairy products, with practice in judging milk, ice cream, butter, and cheese. The emphasis is on recognizing quality in dairy products, detecting specific defects, and learning the causes and means of preventing common defects. A team is chosen from this class to represent

the University in two contests: Eastern States Intercollegiate Dairy Products Judging Contest, and Collegiate Students' International Contest in Judging Dairy Products.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 F.

Mr. NELSON.

52. (II) MARKET MILK.—A study of the various phases of the market milk industry; sanitary production, transportation, pasteurization and handling in the city plant; marketing, delivery systems, milk and its relation to public health, inspection, milk laws, food value, and advertising. Cultured milk and other milk drinks also are included. Some milk plants are visited, the cost of the trip not exceeding five dollars.

2 class hours; 2 2-hour laboratory periods.

Credit, 4.

8:00-8:50 Tu. Th.; 9:00-10:50 Tu. Th. or 3:00-4:50 Tu. Th.

Mr. LINDQUIST.

75. (I) DAIRY CHEMISTRY.—This course is a particular study of those physical and chemical principles which not only explain the behavior of milk and milk products in the various technological operations, but also provide a basic viewpoint for dairy research. The lectures will include discussions (1) of the constituents of milk in relation to other organic compounds, and (2) the physiochemical aspects of certain dairy phenomena such as foaming, coagulation, etc. The laboratory work will include many of the tests used commercially and in dairy research, emphasizing the principles and application of both qualitative and quantitative analysis as well as the technique of operating scientific apparatus.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-10:50 Tu.; 8:00-9:50 Th.

Mr. NELSON.

Prerequisites, Dairy 25, Dairy 52, and Chemistry 52 or permission of the instructor.

77. (I) BUTTER AND CHEESE MAKING.—Half of the semester is devoted to butter making; the remainder to cheese making, condensed and powdered milk. The various phases of the butter industry studied are: separators and cream separation; pasteurization, neutralization, and ripening of cream; preparation of starter cultures; churning; marketing and scoring of butter; creamery management. The work in cheese making includes cheddar, cream, Neufchatel, cottage, processed cheeses, etc. The manufacture of condensed milk, powdered milk, and commercial casein is also covered.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 W. F.; 1:00-3:50 M. F.

Mr. LINDQUIST, Mr. NELSON, Mr. FINNEGAN.

Prerequisite, Dairy 25.

78. (II) ICE CREAM MAKING.—The course includes a study of the principles and practices of ice-cream making. The effects of such factors as composition, quality, pasteurization, homogenization, aging, and freezing on the finished products are considered. Sherbets, ices, fancy and individual forms, and all flavors of ice cream are studied. Some time is devoted to refrigeration, machinery, delivery equipment, and merchandising methods as they are related to the industry.

2 class hours; 2 3-hour laboratory periods. Credit, 4.
11:00-11:50 W. F.; 1:00-3:50 Tu. Th. Mr. NELSON.

79. (I) 80. (II) SEMINAR.—For students specializing in dairy industry.

1 class hour Credit, 1.
11:00-11:50 M. THE DEPARTMENT.

ECONOMICS

Professor GAMBLE, Professor MORRIS, Assistant Professor HALLER, Assistant Professor HOWARD, Assistant Professor SCHOEFFLER, Mr. WEINER.

12. (II) ECONOMIC HISTORY OF THE UNITED STATES.—A study of the significant factors in the economic development of the nation.

3 class hours. Credit, 3.
Mr. HALLER, Mr. HOWARD.

25. (I) and (II) ELEMENTS OF ECONOMICS.—Definitions and introductory principles of production, exchange, and the financial organization of society, with a short survey of the economics of distribution and the use of wealth and income.

3 class hours. Credit, 3.
THE DEPARTMENT.

26. (II) ELEMENTS OF DISTRIBUTION.—A continuation of course 25 with emphasis on the study of wealth and income distribution.

3 class hours. Credit, 3.
Prerequisite, Economics 25.

THE DEPARTMENT.

53. (I) MONEY, BANKING AND CREDIT.—A critical survey of the development and operation of the monetary and banking systems of the United States.

3 class hours. Credit, 3.
Mr. GAMBLE.

55. (I) ECONOMICS OF CONSUMPTION.—A study of patterns of consumption, standards of living and the sources and expenditure of individual and family incomes.

3 class hours. Credit, 3.
Mr. HALLER.

56. (II) BUSINESS FLUCTUATIONS AND FORECASTING.—A study of business fluctuations and an analysis of current business cycle theories.

3 class hours.

Credit, 3.

Mr. SCHOEFFLER.

70. (II) MONOPOLIES.—A study of the growth, development, and social control of monopolies.

3 class hours.

Credit, 3.

Mr. HALLER.

73. (I) MODERN ECONOMIC THEORY.—A study of current theories about value, distribution and prices.

3 class hours.

Credit, 3.

Mr. MORRIS, Mr. SCHOEFFLER.

74. (II) CURRENT ECONOMIC PROBLEMS.—An advanced course for those desirous of studying more intensively some current economic problems. Students will be encouraged to pursue lines of individual interest.

3 class hours.

Credit, 3.

Mr. HOWARD.

77. (I) ECONOMICS OF INTERNATIONAL TRADE (1953-54). A study of the policies, principles, and practices of international trade. Given in alternate years.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. WEINER.

78. (II) PUBLIC FINANCE.—Principles of public revenues and expenditures with special emphasis on the systems and problems of taxation.

3 class hours.

Credit, 3.

Mr. GAMBLE.

79. (I) LABOR PROBLEMS.—An analysis of the background and character of the modern labor problem with special references to the United States. Topics to be considered include: the problems of wages, hours, working conditions and unemployment; the trade union movement; and some agencies for the promotion of industrial peace.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. MORRIS.

80. (II) LABOR LEGISLATION.—A study of federal and state legislation affecting labor.

3 class hours.

Credit, 3.

Mr. MORRIS.

83. (I) SOCIAL CONTROL OF BUSINESS.—Methods of social control of economic activity including both formal and informal controls.

3 class hours.

Credit, 3.

Mr. HOWARD.

84. (II) COMPARATIVE ECONOMIC SYSTEMS.—An examination of the various forms of economic organization that have been tried and proposed with an analysis of the economic institutions of representative current economies.

3 class hours.

Credit, 3.

Mr. SCHOEFFLER.

91. (I) 92. (II) SEMINAR.—Research in economic theory; problems of labor, commerce, and industry. If desirable, some other economic study may be substituted.

1 or 2 2-hour conferences.

Credit, 1 to 3.

THE DEPARTMENT.

EDUCATION

Professor PURVIS, Professor GRIMSHAW, Assistant Professor OLIVER, Assistant Professor ROURKE, Assistant Professor MCCARTHY, Assistant Professor WYMAN, Assistant Professor CARLIN, Mr. TAFT¹.

51. (I) HISTORY OF EDUCATION.—Educational movements are traced from early Greece to the present with the aim of better understanding of modern education. This is normally the beginning course for students undertaking work in Education.

3 class hours.

Credit, 3.

Mr. PURVIS.

52. (II) PRINCIPLES AND METHODS OF TEACHING.—By means of discussion, case studies, and current educational literature, teaching ideals and procedures are set up. Application of the general principles are made in the major fields represented by the class. Given also in the one-semester program.

3 class hours.

Credit, 3.

Mr. MCCARTHY.

53. (I) EDUCATIONAL TESTS AND MEASUREMENTS.—The most serviceable tests and scales for measuring achievement are considered; test construction, administration, scoring, and interpretation of results are studied and practiced. Considerable attention is given to preparation of informal tests for diagnostic and grading purposes. Given also in the one-semester program.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. ROURKE.

60. (I) and (II) ELEMENTARY SCHOOL CURRICULUM.—This course is designed to present a picture of the elementary

¹ State Supervisor for Agricultural Teacher-Training representing the State Department of Education in the administration of vocational agricultural acts.

school curriculum from the standpoint of content and methodology. Emphasis will be placed on the unit method and the activity program.

3 class hours.

Credit, 3.

Mr. _____.

61. (I) and (II) TEACHING OF ELEMENTARY READING AND LANGUAGE ARTS.—This course will discuss and demonstrate emerging methods of preventing and remedying reading difficulties. Attention will be given to the purposes, methods, and materials of oral and written language and reading.

3 class hours.

Credit, 3.

Mr. _____.

62. (I) and (II) TEACHING OF ELEMENTARY ARITHMETIC AND SCIENCE.—This course will discuss and demonstrate accepted methods and materials in the teaching of these subjects in the intermediate grades. Attention will be given to methods of integrating these courses into the total program of the school.

3 class hours.

Credit, 3.

Mr. _____.

64. (II) PRINCIPLES OF ELEMENTARY EDUCATION.—This course is designed to acquaint the student with the aims, organization, program, pupil population, etc., of the elementary school and the relationship between this level of education and the secondary school level which follows.

3 class hours.

Credit, 3.

Mr. _____.

66. (I) and (II) PREPARATION AND USE OF AUDIO-VISUAL AIDS.—Study is made of available media of audio-visual aids to instruction, construction of visual material, and accepted methods of use.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. WYMAN.

72. (II) VOCATIONAL EDUCATION IN AGRICULTURE.—The course demands certain prerequisites of experience and a definite objective on the part of the student to enter the field of vocational agricultural teaching which makes it necessary for the student to seek permission to enter the course. It is the first of the series of special courses (72, 73, 75) required of candidates for the vocational teacher-training certificate. A survey of vocational education and an introduction to teaching of vocational agriculture at the secondary school level is the basis of the course. Certain information and observations in preparation for the apprenticeship course are offered.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. W. F.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

73. (I) and (II) APPRENTICE TEACHING IN AGRICULTURE.—For a limited number of qualified candidates in vocational education. A full year in absentia normally following the junior year in college, teaching agriculture, horticulture, and related subjects. Candidates should have completed the course in Education 72, and in Education 52, if possible and must apply early to the instructor of the course.

Maximum credit, 6.

MR. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

75. (I) TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE.—By arrangement with the instructor. Preferably this course should follow Courses 72 and 73. It covers the materials, methods, policies, and special requirements of Massachusetts for teaching agriculture and related subjects in high schools and special county schools. This is one of three courses required of candidates for the agricultural teacher-training certificates.

2 class hours; 1 2-hour laboratory period. Credit, 3.

MR. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

79. (I) METHODS IN ADULT EDUCATION.—Admission only by permission of instructor. The beginning Education course for juniors and seniors who are training for extension work and for others interested in teaching adults. Generally accepted methods of group and individual instruction with adults, and methods of developing leaders to carry on the work in the field.

2 class hours; 1 2-hour laboratory period Credit, 3.

Mr. ———.

83. (I) PRINCIPLES OF SECONDARY EDUCATION.—This course presents a picture of the secondary school as a social agency, its relation to elementary and collegiate education, its aims, organizations, administration, curriculum procedures, and such other phases as are necessary to acquaint the student with the predominant level of our educational ladder. Given also in the one-semester program.

3 class hours. Credit, 3.

Mr. MCCARTHY.

85. (I) and (II) OBSERVATION AND PRACTICE TEACHING.—Admission by permission of the Department. An opportunity to do regular teaching in cooperating schools within commuting distance of the University. The student works under the supervision of a teacher with frequent visits from some member of the university staff.

Credit, 3-6.

THE DEPARTMENT.

Prerequisites, Education, 51, 52, 83 or their equivalent.

88. (II) SECONDARY SCHOOL CURRICULUM.—For senior majors in Education. A consideration of learning material and activities and their organization in the subjects which these students are teaching, and the preparation of courses of study in those fields in the light of accepted educational practice. Given also in the one-semester program.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

In the One-Semester Program, scheduled as 3 2-hour periods the first and each alternate week.

Mr. ROURKE.

RECREATION EDUCATION

51. (I) PRINCIPLES OF RECREATION.—This course considers recreation as an important social force in education and community living. Emphasis is given to the study and discussion of established principles and their applicability to functional recreation programs.

3 class hours.

Credit, 3.

Mr. GRIMSHAW.

52. (II) GROUP LEADERSHIP AND CAMP COUNSELING.—A study of principles and practices dealing with leadership problems, group work methods, camp counseling, and organization. Application is made to youth-serving agencies and organized camps through practical observations and demonstrations. Special attention is given to social and educational outcomes for adolescents.

3 class hours.

Credit, 3.

Mr. GRIMSHAW.

Prerequisite, Recreation Education 51.

53. (I) SOCIAL RECREATION (1953-54).—Provides leadership preparation in a wide range of social recreation for various age levels. Selecting and developing materials for use in actual situations is required. Opportunity is provided for practical experience in planning and conducting party games and mixers, group singing, social and square dancing, outings and picnics, and other mass activities for home, church, club, camp, playground, hospital and institutional use. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ———.

Prerequisite, Recreation Education 51.

54. (Summer) FIELD WORK EXPERIENCE.—Supervised off-campus field work experience is required of students preparing for leadership and teaching responsibilities in recreation and outdoor education. Assignments of one month are arranged for field experience during the summer following the junior year. Cooperating recreation centers, camps, schools, hospitals, industries, and other youth-serving organizations

provide students with actual leadership preparation. Students are guided in their study through the use of a workbook adapted for the purpose and personal supervision. Placement arrangements should be made with the guidance of the major advisor as early as possible in the junior year. Required as excess graduation credits.

Mr. GRIMSHAW.

75. (I) FIELD WORK ANALYSIS.—A seminar for recreation majors. The course is planned primarily to discuss and evaluate supervised student leadership experience in community recreation, camping, and outdoor education. Student reports, staff appraisals, and workbook problems contribute to the analysis of field experience and student accomplishments.

3 class hours.

Credit, 3.

Mr. GRIMSHAW.

Prerequisite, Recreation Education 54.

76. (II) PUBLIC RELATIONS IN RECREATION.—This course is intended to provide opportunity for a study of the purposes and methods in developing and maintaining interest and understanding in public recreation. The course explores recommended programs and procedures for establishing good public relations and securing recreation as an important community affair. Provision is made for practical application and evaluation of selected techniques and their effectiveness in creating favorable public opinion.

3 class hours.

Credit, 3.

Mr. GRIMSHAW.

Prerequisite, Recreation Education 51.

77. (I) ORGANIZING AND CONDUCTING COMMUNITY RECREATION.—This course gives special attention to program planning for rural and urban recreation areas, neighborhood centers, adult education projects, and community activities. Organization and management including scheduling, staff assignments, record keeping, reports, special events, promotion and other departmental problems are considered.

3 class hours.

Credit, 3.

Mr. GRIMSHAW.

78. (I) or (II) SPECIAL PROBLEMS IN RECREATION AND OUTDOOR EDUCATION.—Admission with approval of the major advisor. A qualified senior may elect to undertake independent study of a selected problem in the area of his primary interest or specialization.

3 class hours.

Credit, 3.

Mr. GRIMSHAW.

Prerequisite, Recreation Education 54.

AGRICULTURAL ENGINEERING

Professor STAPLETON, Associate Professor MARKUSON, Assistant Professor TAGUE, Assistant Professor PUSHEE, Assistant Professor PATTERSON, Mr. STEPHAN.

51. (I) HOUSE PLANNING.—Plan designs of the small house, will be made. The arrangement of interior equipment, especially in the kitchen, and lighting, heating, water supply, and sewage disposal will be studied, together with a brief history of the house materials, construction methods, equipment, and architectural styles. Consideration will be given to the economics of house building, including financing and to maintenance and overhead expense.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. MARKUSON.

55. (I) FARM SHOP.—For students in agriculture and horticulture. Laboratory exercises cover instruction and practice in the use of carpenter's tools in construction and in bench work, arc and gas welding, pipe fitting, soldering, use of machinist's tools in machinery repair, and the mixing and placing of concrete. Classroom instruction covers materials of construction and the utilization of local and special materials for these purposes.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. PUSHEE.

71. (I) FARM POWER.—The study of internal combustion engines used in farm tractors and power units.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. PATTERSON.

Prerequisites, Civil Engineering 52, Mechanical Eng. 65, 68.

72. (II) DRAINAGE AND IRRIGATION ENGINEERING.—This course is an abridgment of Agricultural Engineering 78 for students not majoring in Engineering who do not have the prerequisites for Course 78.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

Mr. STAPLETON.

73. (I) FARM STRUCTURES.—A study of the strength and durability of building materials, construction systems and the mechanical principles underlying their use in farm-construction. In the drafting room studies will be made of some major farm building and complete working drawings finished in all essential details.

1 class hour; 3 2-hour laboratory periods.

Credit, 4.

Mr. STAPLETON.

Prerequisites, Civil Engineering 34, 51; Mechanical Eng. 61.

74. (II) FARM STRUCTURES.—This course is an abridgment of Agricultural Engineering 73 for students not majoring in Engineering who do not have the prerequisites for Course 73.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. MARKUSON.

76. (II) AGRICULTURAL MACHINERY.—The study of design and operational problems of agricultural field machinery.

2 class hours; 1 2-hour laboratory period. Credit, 3.

Mr. PATTERSON.

Prerequisites, Civil Engineering 52, Mechanical Eng. 68, 83.

78. (II) DRAINAGE, RECLAMATION AND CONSERVATION.—The course covers the engineering phase of drainage and reclamation. The various systems are studied, complete layouts established in the field, and problems of flow and run-off given.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. STAPLETON.

Prerequisites, Civil Engineering 25, 75 or 76; Agronomy 2.

80. (I) and (II) FOOD PROCESS ENGINEERING.—A study of food processing machinery and instrumentation.

2 class hours; 1 2-hour laboratory period. Credit, 3.

Mr. PFLUG.

82. (II) REFRIGERATION.—Fundamentals in planning and operating a refrigerated storage with particular reference to size, details of construction, cooling load, and refrigerating machinery and accessories. For non-engineering majors.

1 class hour; 1 3-hour laboratory period. Credit, 2.

Mr. PFLUG.

83. (I) 84. (II) AGRICULTURAL ENGINEERING PROBLEMS.—Open only to seniors specializing in agricultural engineering. This course consists of individual problems chosen by the students under guidance of the department.

Hours by arrangement.

Credit, 3.

THE DEPARTMENT.

85. (I) RURAL ELECTRIFICATION.—A course devoted to the utilization of electricity in agriculture.

2 class hours; 1 2-hour laboratory period. Credit, 3.

Mr. STAPLETON.

Prerequisites, Electrical Engineering 61, 62.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in agricultural engineering.

1 class hour.

Credit, 1.

THE DEPARTMENT.

CHEMICAL ENGINEERING

Professor LINDSEY, Assistant Professor CASHIN, Mr. SOLSTAD.

55. (I) CALCULATIONS.—A problem course covering the applications of conservation of mass and energy in chemical processing; the ideal gas, gas mixtures, vapor pressure, the material balance, the energy balance, fuels and combustion.
3 class hours.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemistry 29, 30; Math. 31, 32; Physics, 25, 26.

56. (II) UNIT OPERATIONS I.—A study of the fundamental principles underlying the unit operations of fluid flow, heat transfer, evaporation, humidity and air conditioning, and drying. The general theory of mass transfer by diffusion is taken up before the study of the last two operation. Emphasis is on the quantitative aspects.

3 class hours.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemistry 65; Chemical Engineering 55.

57. (I) INORGANIC CHEMICAL TECHNOLOGY.—A study of the manufacture of some of the important inorganic chemicals. Topics studied include sulfuric acid, nitric acid, hydrochloric acid, ammonia, sodium carbonate, and sodium hydroxide with particular stress on unit operations. Field trips will be included where possible.

3 class hours.

Credit, 3.

Mr. CASHIN.

Prerequisites, Chemistry 30; Physics 26.

58. (II) ORGANIC CHEMICAL TECHNOLOGY.—A study of some of the unit processes involved in the manufacture of organic materials. Unit processes studied include nitration, amination, halogenation, oxidation, and esterification. Field trips will be included where possible.

3 class hours.

Credit, 3.

Mr. CASHIN.

Prerequisite, Chemistry 51.

60 (II) HEAT ENERGY RELATIONS.—A study of the energy relations in chemical processes. Includes: A review of concepts, energy balances, entropy, thermodynamic functions, properties of fluids, flow relations, compression processes, refrigeration process, phase equilibria, reaction equilibria.

3 class hours.

Credit, 3.

Mr. CASHIN.

Prerequisites, Chemistry 65; Chemical Engineering 55.

75. (I) INSTRUMENTATION.—A detailed study of the underlying principles and practices of indicating, recording, and controlling instruments used on industrial process equipment.

3 class hours.

Credit, 2.

Mr. CASHIN.

Prerequisites, Physics 25, 26; Chemical Engineering 56.

76. (II) PROFESSIONAL SEMINAR.—Preparation and discussion of professional, economic, political, humanistic, and other topics of interest to chemical engineers. For seniors majoring in chemical engineering.

2 class hours.

Credit, 2.

THE DEPARTMENT.

77. (I) ELEMENTS OF UNIT OPERATIONS.—For other than chemical engineering majors. An introduction to some of the unit operations of chemical engineering, especially those which may be of use in other process industries.

2 class hours; 1 2-hour computation or laboratory period.

Credit, 3.

Mr. SOLSTAD.

Prerequisites, Chemistry 65 and 66 previously or concurrently or Mechanical Engineering 63 and 64 or 65 and 66.

89. (I) CHEMICAL ENGINEERING LABORATORY.—A quantitative study of pilot plant size equipment illustrating the unit operations. Special emphasis is placed on the securing of reliable data, correct operating techniques, and on the writing of industrial type reports.

1 3-hour period.

Credit, 2.

Mr. SOLSTAD.

Prerequisite, Chemical Engineering 56.

90. (II) LABORATORY PROJECTS.—Investigation and report on an elementary chemical engineering problem. Problems will be assigned by the staff and may include the design, construction, operation, and testing of a piece of unit operations or unit process equipment, and the submission of a final comprehensive report.

2 4-hour laboratory periods.

Credits, 4.

THE DEPARTMENT.

Prerequisites, Chemical Engineering 89, 93.

93. (I) COMPREHENSIVE PROBLEMS.—The solution of comprehensive problems which involve the application and integration of a number of the principles studied in previous courses in chemistry and chemical engineering. Particular emphasis is placed on the use of the economic balance in making decisions, such as the selection of equipment and choice of operating conditions.

2 class hours; 1 3-hour period.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 56, 60.

94. (II) COMPREHENSIVE PROBLEMS II.—The solution of problems similar to those in Course 93 will be undertaken, but in addition, will involve the application of principles studied in Course 97.

2 class hours; 2 3-hour periods.

Credit, 4.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 93, 97.

97. (I) UNIT OPERATIONS II.—A continuation of Course 56, including the additional unit operations of distillation, gas absorption, solvent extraction, crystallization, filtration, mixing, crushing and grinding.

3 class hours.

Credit, 3.

Mr. CASHIN.

Prerequisite, Chemical Engineering 56.

98. (II) ADVANCED UNIT OPERATIONS.—An extension of certain phases of heat transfer, diffusion and distillation.

2 class hours.

Credit, 2.

Mr. CASHIN.

Prerequisite, Chemical Engineering 97.

CIVIL ENGINEERING

Professor MARSTON, Professor WHITE, Associate Professor OSGOOD, Associate Professor HENDRICKSON, Assistant Professor FENG, Assistant Professor MARCUS, Assistant Professor GROW, Assistant Professor RICHARDS, Mr. GABRYS.

25. (I) SURVEYING.—The theory of surveying for both measurement and layout work, description of field and office methods of computations, notes, and drafting procedure are given in the classroom. Topics covered are use of tape, transit, level, and plane table; methods of carrying out property surveys, layout surveys, computation and field work for simple and compound horizontal and vertical curves, determination of geographic position, determination of azimuth from the Sun and Polaris, and a finished map of a small area.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. HENDRICKSON.

Prerequisite, Trigonometry.

27. (I) and (II) PLANE SURVEYING.—The basic principles of mensuration are discussed in class. Instruction and problems involving the use of tape, transit and level are given in the field, and the preparation of a map of a small area is carried out in the drafting room. Route surveying is considered briefly. This course is not open to civil engineering students.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. GABRYS.

Prerequisite, Mathematics 5 or 7.

28. (Summer) PROPERTY AND TOPOGRAPHIC SURVEYING.—This course consists of a transit and tape property survey in which reference to Registry of Deeds records is required, and topographic survey of a selected area using the plane table. Certain advanced topics such as triangulation and conformal coordinate systems are discussed as they relate to the topographic survey.

3 44-hour weeks.

Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Civil Engineering 25 or 27.

30. (Summer) ROUTE SURVEYING PRACTICE.—This practice course consists of a preliminary survey for a short highway location and of the preparation of maps and profile from the data recorded on the survey. The maps are to be used in C.E. 55 in choosing the final location of the route and in estimating earthwork quantities and cost.

3 44-hour weeks.

Credit, 3.

Mr. OSGOOD.

Prerequisite, Civil Engineering 25 or 27.

34. (II) APPLIED MECHANICS (STATICS).—The following topics are considered: equilibrium of forces, friction, first and second moments, center of gravity. Algebraic and graphical methods are covered.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Physics 25; Mathematics 31.

51. (I) STRENGTH OF MATERIALS.—The following topics are considered: simple stresses and strains; combined stresses; torsion; shear and bending moments in beams; stresses and deflections of beams; columns.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Civil Engineering 34; Mathematics 32.

52. (I) and (II) APPLIED MECHANICS (KINETICS).—The following topics are considered: kinematics, motion of particles, motion of rigid bodies, work and energy, power, impulse and momentum.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Civil Engineering 34; Mathematics 32.

53. (I) STRENGTH OF MATERIALS.—A shortened version of C.E. 51 for electrical and mechanical engineers in the industrial option.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. RICHARDS, Mr. MARCUS.

Prerequisites, Civil Engineering 34; Mathematics 32.

55. (I) HIGHWAY ENGINEERING.—The design features of highway construction and relative merits of various types of highway surfaces are discussed in class. Plans, profiles, cross sections, and specifications for a short section of highway are prepared.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. GABRYS.

61. (I) and (II) TESTING OF MATERIALS.—A study of laboratory methods for the determination of the physical properties of engineering materials and their behavior under stress. Usual methods supplemented by study of true stress-true strain for plastic action, stress analysis through strain study by photo-elastic analysis and electric strain gages. Magnaflux and Zyglo inspection, special hardness tests, X-ray examination and research problems included in the lecture material.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Mr. RICHARDS.

Prerequisite, Civil Engineering 51 or 53.

70. (II) THEORY OF STRUCTURES.—This course treats with the analysis of statically determinate structures of wood and steel, with reference to particular structures, such as industrial and office buildings, highway and railway bridges. The use of influence lines in the study of movable loads is included.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. OSGOOD, Mr. GROW.

Prerequisite, Civil Engineering 51.

71. (I) STRUCTURAL DESIGN.—This course is an application of the theory of structures to engineering practice through the preparation of designs and drawings for structural frames, girders and trusses in steel and wood that together make up a complete building frame or bridge. Emphasis is placed upon the design of structural members and joints.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. OSGOOD, Mr. GROW.

Prerequisite, Civil Engineering 70.

72. (II) ADVANCED STRUCTURAL THEORY.—The analysis of space frames and methods of finding deflections of trusses and beams are studied. Several methods of analysis of statically indeterminate structures are introduced. Application of the theories considered is made in the solution of practical problems during the laboratory periods.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. OSGOOD.

Prerequisite, Civil Engineering 70.

73. (I) CONCRETE.—This course deals with the general methods of analyzing plain and reinforced concrete structures. Application is made to the design of slabs, beams, girders, columns, walls and foundations for buildings, retaining walls and bridges. Drawings are prepared for a reinforced concrete building.

2 class hours; 2 3-hour laboratory periods. Credit, 4.

Mr. OSGOOD, Mr. GABRYS.

Prerequisite, Civil Engineering 51.

75. (I) FLUID MECHANICS.—This course is an abridgment of Civil Engineering 76.

3 class hours.

Credit, 3.

Mr. MARSTON, Mr. FENG.

Prerequisite, Civil Engineering 52.

76. (I) and (II) FLUID MECHANICS.—The following topics are considered: properties of fluids, gas laws, viscosity, static pressure, gages, buoyant forces, dynamics of fluids, Bernoulli's theorem, flow in pipes, orifices, nozzles, weirs, and open channels. Hydraulic similitude and dimensional analysis are discussed.

3 class hours, 1 3-hour laboratory period Credit, 4.

Mr. MARSTON, Mr. FENG.

Prerequisite, Civil Engineering 52.

77. (I) SANITARY ENGINEERING.—This course considers the engineering aspects of public water supply systems and includes the following topics; quantity of water required; hydrology; collection systems; distribution systems; pumping machinery; purification work. The laboratory period is used for inspection trips and the treatment of special problems.

3 class hours.

Credit, 3.

Mr. FENG.

Prerequisite, Civil Engineering 76 or 75 concurrently.

78. (II) SANITARY ENGINEERING II.—This course treats the engineering aspects of the design, construction, and maintenance of sewerage systems and includes the following topics: hydraulics of sewers, sanitary and storm sewers, sewage treatment, plant design and operation.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. FENG.

Prerequisite, Civil Engineering 75 or 76.

79. (I) PRINCIPLES OF SANITARY ENGINEERING. — This course is designed to fill the needs of students in the Department of Public Health. It covers phases of Civil Engineering 77 and 78 with consideration of the non-engineering background of the student. Admission by permission of the instructor.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. FENG.

80. (II) SOIL MECHANICS.—This course is a study of the mechanical classification of soil based upon field and laboratory work and the validity of these classifications as a means of predicting soil behavior. The student is guided through case studies in embankment stability, seepage and consolidation. 2 class hours; 1 3-hour laboratory period. Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Geology 50

81. (I) FOUNDATIONS.—A survey of modern theories and practice in transferring structural loads to earth masses. Pile foundations, spread footings, caissons, and buoyant systems are discussed.

2 class hours, 1 3-hour laboratory period.

Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Civil Engineering 80.

86. (II) SANITARY ENGINEERING DESIGNS.—This is a laboratory course devoted to the design of sanitary engineering facilities, water supply and treatment, sewerage and sewage treatment.

1 class hour; 2 3-hour laboratory periods.

Credit, 3.

Mr. FENG.

Prerequisites, Civil Engineering 77 and 78, or concurrently.

88. (II) ADVANCED STRESS ANALYSIS.—This course is concerned with the determination of stresses and strains in structural and machine elements.

3 class hours.

Credit, 3.

Mr. WHITE.—

Prerequisite, Civil Engineering 51 (with a grade of 75).

90. (II) CONTRACTS, SPECIFICATIONS AND ESTIMATING.—A study of the essentials of contracts as applied to business procedures in the construction field, the purposes and make-up of specifications, and the processes of estimating through quantity surveys and unit cost applications.

3 class hours.

Credit, 3.

Mr. MARKUSON.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in civil engineering. Current engineering projects are described by student reports. The professional aspect of the civil engineer's work is stressed.

1 class hour.

Credit, 1.

THE DEPARTMENT.

94. (II) ADVANCED SURVEYING.—The following topics are included: elements of astronomy, precise methods of surveying, adjustment of observations and the elements of photogrammetry.

2 class hours. 1 3-hour laboratory period.

Credit, 3.

Mr. HENDRICKSON.

Prerequisites, Civil Engineering 25, 28.

96. (II) HYDRAULIC ENGINEERING.—The analysis and design of hydraulic structures such as storage reservoirs, spillways, dams, levees, and shore protection and channel works are considered.

2 class hours. 1 3-hour laboratory period. Credit, 3.

Mr. MARSTON.

Prerequisites, Civil Engineering 71, 73, 76.

ELECTRICAL ENGINEERING

Professor BROWN, Professor ROYS, Associate Professor

LANGFORD, Assistant Professor MOHN, Assistant

Professor SMITH, Mr. LEVINE,* Mr. HIGGINS

41. (I) FUNDAMENTALS OF ELECTRICAL ENGINEERING.—This course is a study of direct-current circuits, magnetism and electromagnetism, magnetic fields in air and iron, induced and generated voltages, inductance, capacitance, electric fields, conduction in liquids, and basic electrical measurements. The laboratory is devoted largely to electrical measurements, including instrument calibration and standardization, electrical instruments, fluxmeters, permeameters, simple bridges and potentiometers, and stresses analysis of methods and accuracies.

3 class hours; 1 3-hour laboratory period. Credit, 4.

Mr. BROWN.

Prerequisite, Mathematics 6.

42. (II) ALTERNATING-CURRENT CIRCUITS.—This course is a study of alternating currents in power and communication circuits, and includes instantaneous voltage and current relationships, vector representation, resonance, phenomena, basic network theorems, coupled circuits, single phase and polyphase circuits, power and power measurements, non-sinusoidal waves.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

Mr. MOHN.

Prerequisite, Electrical Engineering 41.

53. (I) DIRECT-CURRENT MACHINERY.—This course is a study of direct-current generators and motors with respect to their characteristics, design, operation, applications and control.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. MOHN.

Prerequisite, Electrical Engineering 41.

* On leave of absence for military service.

54. (II) **ALTERNATING-CURRENT MACHINERY.**—This course is a study of alternating-current generators, motors, transformers, and converters with respect to their design, operation, control and applications.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. BROWN.

Prerequisites, Electrical Engineering 42, 53.

55. (I) **ELECTRONICS.**—This course includes the study of electron motion in electric and magnetic fields, electron tubes and their characteristics, rectifiers, and Class A amplifiers.

2 class hours; 1 quiz hour; 1 2-hour lab. period.

Credit, 3.

Mr. LANGFORD.

Prerequisite, Electrical Engineering 42.

56. (II) **APPLIED ELECTRONICS.**—This is a continuation of Course 74 and includes a study of electron tubes and associated apparatus in amplifiers, oscillators, amplitude and frequency modulation, detection, multivibrators, and vacuum tube instruments.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. LANGFORD.

Prerequisite, Electrical Engineering 55.

57. (I) **ENGINEERING ANALYSIS.**—This course is a study of differential equations as applied to electric systems, hyperbolic, Bessel, and Legendre functions, vector analysis and calculus with applications to electricity and magnetism, elliptic integrals, and solutions of field problems by conformal mapping.

3 class hours.

Credit, 3.

Mr. ROYS.

Prerequisites, Mathematics 32; Electrical Engineering 41.

58. (II) **ELECTRICAL NETWORK ANALYSIS.**—This course is a review of fundamental circuit principles and theorems, Fourier Series and Integral and their applications to distorted waves and pulses, long lines and filters under steady state a-c conditions and traveling waves in transmission systems.

3 class hours.

Credit, 3.

Mr. ROYS.

Prerequisite, Electrical Engineering 42.

61. (I) 62: (II) **PRINCIPLES OF ELECTRICAL ENGINEERING**—This course is designed for mechanical, industrial, and agricultural engineering students, and is a study of d-c and a-c circuits, d-c and a-c machines, and basic electronics.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. HIGGINS.

Prerequisites, Physics 26; Mathematics 32.

63. (I) and (II) ELEMENTS OF ELECTRICAL ENGINEERING.—This course is for civil and chemical engineering students and is a brief study of d-c and a-c circuits and machines.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SMITH

Prerequisites, Physics 26; Mathematics 32.

64. (II) INDUSTRIAL APPLICATIONS.—This course is designed for mechanical and industrial engineering students and is a brief study of motor selection and control, protective devices, and electric and electronic applications in industry, including measurement and control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SMITH.

Prerequisite, Electrical Engineering 62.

79. (I) ELECTRICAL COMMUNICATIONS.—This course is a study of the fundamentals of communication circuits, including circuit elements, basic network theorems, impedance transformations, equalizers, and bridge circuits.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. LANGFORD.

Prerequisite, Electrical Engineering 42.

80. (II) ELECTRICAL COMMUNICATIONS.—This is a continuation of course 75 and includes a study of vacuum tube circuits used in communications, distortion, noise, class B and C power amplifiers, modulation and demodulation practice, oscillator design, transmitters and receivers, antennas and radiation, and electromechanical transducers.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. LANGFORD.

Prerequisites, Electrical Engineering 56, 79.

81. (I) ADVANCED ELECTRICAL MACHINERY.—This is a continuation of Course 54 and is a more advanced study of machines, including the general methods of machine analysis through the use of matrices, symmetrical components, equivalent circuits, and circle diagrams. Emphasis is placed on single-phase and variable-speed a-c motors, converters and inverters, selsyns and amplidynes, and multiwinding transformers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. BROWN.

Prerequisites, Electrical Engineering 54.

82. (II) POWER APPLICATIONS IN INDUSTRY.—This course is a study of industrial applications of electrical machines, and includes power supplies to industrial plants, load requirements, types of drives, mechanical requirements of

variable speed drives, torque relations in d-c and a-c motors, motor applications and control, and selsyn systems.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. BROWN.

Prerequisite, Electrical Engineering 81.

83. (I) TRANSIENT ANALYSIS.—This course is a study of the transient behavior of electrical, mechanical and thermal systems, and includes the formulation of the ordinary and partial differential equations of dynamic systems and their solution by the classical and Heaviside methods and by Fourier and Laplace transforms.

3 class hours.

Credit, 3.

Mr. ROYS.

Prerequisites, Electrical Engineering 42, 57.

84. (II) INDUSTRIAL ELECTRONICS.—This course is a study of special characteristics of the electron tubes of industry, the theory, design and operation of commercial types of circuits utilizing these tubes, including stroboscope, grid-controlled and polyphase rectifiers, inverters, welding controllers, speed and voltage regulators, high frequency heating circuits, and others.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. ROYS.

Prerequisite, Electrical Engineering 55.

85. (I) ELECTRICAL MEASUREMENTS.—This course is a study of the theory and practice of electrical and magnetic measurements and measurements devices; emphasis is placed on accuracy, precision, and limitations.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. ROYS.

86. (II) POWER SYSTEM NETWORKS.—This course is a study of power system networks including power transfer diagrams, voltage studies, system stability criteria, short-circuit calculations, and protective methods.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. BROWN.

Prerequisites, Electrical Engineering 58, 81.

88. (II) ELECTRIC POWER DISTRIBUTION.—This course consists of a study of the particular problems relating to the distribution of electric power. Some of the topics considered are radial and loop systems, automatic load transfer, voltage regulation, and short circuit protection.

3 class hours.

Credit, 3.

Mr. BROWN.

Prerequisite, Electrical Engineering 58.

91. (I) **SERVOMECHANISMS I.**—This course is a study of basic types or error-sensitive control systems; proportional, differential and integral controllers; transient behavior; criteria for error-free operation; and practical electrical and mechanical systems. Classical methods of analysis will be employed.

3 class hours; 1 3-hour laboratory period. Credit, 4.

Mr. BROWN.

Prerequisite, Electrical Engineering 57 or Mechanical Engineering 85.

92. (II) **PROFESSIONAL SEMINAR.**—For seniors majoring in electrical engineering. Current engineering developments are discussed through student reports. The professional aspects of the electrical engineer's work is stressed. Instruction is given in the preparation of engineering papers for publication and in their presentation before technical audiences.

1 class hour. Credit, 1.

Mr. BROWN.

94. (II) **ULTRA-HIGH-FREQUENCY TECHNIQUES.**—This course is a study of u.h.f. oscillators, amplifiers, transmitters, receivers, transmission systems, antennas, multi-vibrators, trigger and gate circuits, electronic switches, and controls.

3 class hours; 1 3-hour laboratory period. Credit, 4.

Mr. BROWN.

Prerequisites, Electrical Engineering 56, 79.

96. (II) **PRINCIPLES OF ELECTRICAL DESIGN.**—The fundamentals of electric, dielectric, magnetic and heat-flow systems as applied to the design, rating and life of coils, transformers, machinery and other electrical equipment.

2 class hours; 1 3-hour calculation period. Credit, 3.

Mr. ROYS.

Prerequisite, Electrical Engineering 54.

98. (II) **TELEVISION ENGINEERING.**—The application of electronics and radio engineering to the special problems of television. Among the topics considered are the fundamentals of scanning and bandwidth selection; noise limitations associated with primary and secondary emission; iconoscope, image orthocon, image-dissector, and other types of pickup tubes, kinescopes; television transmitters, receivers and antennas.

3 class hours; 1 3-hour laboratory period. Credit, 4.

Mr. LANGFORD.

Prerequisites, Electrical Engineering 56 and 83.

MECHANICAL ENGINEERING

Professor BATES, Professor SWENSON, Professor WEAVER, Associate Professor KEYSER, Associate Professor DITTFACH, Assistant Professor LONGSTAFF, Assistant Professor EMERSON,† Assistant Professor LAKE,† Assistant Professor ATHERTON, Assistant Professor SOBALA, Mr. COSTA, Mr. LINDNER.

1. (I) ENGINEERING DRAWING.—The purpose of the course is to develop skill in the use of drafting equipment with a working knowledge of orthographic projections, lettering, auxiliary views, sectional views, tracings and pictorial representation of machine parts.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

2. (II) DRAWING AND DESCRIPTIVE GEOMETRY.—During the first part of the course a study of dimensioning, fastenings, and conventional representations is made. The remainder of the course is devoted to descriptive geometry and encompasses a study of graphical methods applicable to engineering problems.

1 class hour; 2 3-hour laboratory periods.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 1.

23. (Summer) SHOP.—The course is designed primarily for engineers other than mechanical. Approximately half the semester is spent in welding; in the other half the student gains experience in the machine shop, where he becomes familiar with the various machine and hand tools used in metal working.

2 4-hour laboratory periods.

Credit, 3.

Mr. COSTA.

27. (Summer) SHOP.—In the first part of the course woodworking and pattern making experience is gained on machines and with hand tools at the bench. The course then proceeds to the various methods of welding.

2 4-hour laboratory periods.

Credit, 3.

Mr. PATTERSON, Mr. COSTA.

28. (Summer) MACHINE SHOP.—A knowledge of metal-working equipment is obtained by using the fundamental machine tools such as the lathe, planer, shaper, milling machine and drill press. A reasonable amount of bench work is included. Classroom work is devoted to the theory of machine tool operation, fits, tolerances and measurement.

2 4-hour laboratory periods.

Credit, 3.

Mr. COSTA.

39. (I) and (II) MATERIALS OF CONSTRUCTION.—Properties of engineering materials; failure by (a) exceeding the elastic limit, (b) creep, (c) fatigue, and (d) corrosion. The crystalline nature of metals. Properties and uses of the structural metals, wood, stone, clay products, cementing materials, concrete, plastics, protective coatings, and water.

2 class hours.

Credit, 2.

Mr. KEYSER.

Prerequisites, Chemistry 2 or 4; Physics 25, taken previously or concurrently.

46. (II) FUNDAMENTALS OF METALLURGY.—Physical metallurgy involving crystal structure, solid solutions, diffusion in the solid state, freezing of metals, hardening of metals, annealing, and equilibrium diagrams. These fundamentals are applied to a study of the iron-iron carbide diagrams, time-temperature-transformation relationships for steel, the heat treatment of steel, and heat-treating equipment. Laboratory work is intended to substantiate some of the principles developed in lecture work and to acquire basic skill in metallographic technique.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. KEYSER

Prerequisites, Mechanical Engineering 39 or Chemistry 66.

63. (I) ENGINEERING THERMODYNAMICS I.—This course is a treatment of the application of the laws of heat to various energy-transforming devices. Topics include ideal and actual cycles of steam, internal combustion engines, and air compressors together with problems pertaining to these machines, energy transformations in fluid flow, variable specific heats and mixtures of gases.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisites, Physics 26; Mathematics 30 or 32.

64. (II) ENGINEERING THERMODYNAMICS II.—A continuation of the work of Course 63. Study will be made of liquids and vapors, thermodynamic cycles, energy transformations and the transfer of heat, together with engineering problems pertaining to these devices.

4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 63.

65. (I) HEAT ENGINEERING I.—This course is a survey of the field of applied energy and is designed for engineering students outside of the mechanical engineering field. The application of the laws of heat to energy transforming devices is studied, but not as extensively as in Courses 63 and 64. A

study will be made of gases, vapors, fuels, combustion, heat transfer, measurement of power, and internal combustion engines.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, Physics 26; Mathematics 6.

66. (II) HEAT ENGINEERING II.—A continuation of the work of Course 65. Air compressors, fans, refrigeration, and air conditioning turbines, jet propulsion and power plants will be studied.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 65.

67. (I) MECHANICAL INSTRUMENTATION LABORATORY.—The calibration and application of instruments used in the testing of mechanical engineering apparatus.

1 3-hour laboratory period.

Credit, 1.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 63 concurrently.

68. (II) KINEMATICS.—Principles of mechanism, including velocity and acceleration diagrams, instant centers, gear teeth and gear trains, eams, and various speed transmissions.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES, Mr. SOBALA.

Prerequisites, Mechanical Engineering 1; Civil Eng. 52.

75. (I) STEAM POWER PLANTS.—This course is a study of the steam power plant, including boilers, stokers, fuels, combustion, steam generation, prime movers, and auxiliary equipment, and engineering problems involved in design and operation.

3 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SWENSON.

Prerequisite, Mechanical Engineering 64.

76. (II) REFRIGERATION AND AIR CONDITIONING.—The course content includes a study of the fundamental principles of thermodynamics as applied to refrigeration and air control. Application of refrigeration to industrial processes and the control of temperature, humidity and motion of air in buildings will be studied.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SWENSON, Mr. ATHERTON.

Prerequisite, Mechanical Engineering 64.

77. (I) INTERNAL COMBUSTION ENGINES.—A study is made of spark-ignition and compression-ignition engines including design, fuels, carburetion, ignition, combustion, lubrication, cooling, and engine performance. The gas turbine and jet propulsion will be included.

3 class hours.

Credit, 3.

Mr. DITTFACH.

Prerequisite, Mechanical Engineering 64.

79. (I) MECHANICAL ENGINEERING LABORATORY I.—Tests of fuels and lubricants. Performance tests of steam engines and turbines, gasoline and Diesel engines, fans, hydraulic apparatus, refrigeration systems and other typical engineering equipment. Emphasis on laboratory procedure and orderly presentation of results.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisites, Civil Engineering 76 or 75 concurrently; Mechanical Engineering 64 or 66; Mechanical Engineering 67 for Mechanical Engineering majors.

80. (II) MECHANICAL ENGINEERING LABORATORY II.—This course continues the work of the first semester in more advanced phases.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 79.

83. (I) MACHINE DESIGN.—Principles involved in the design of various machine parts including fastenings, shafts, belts, bearings, gears, and pressure vessels.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES.

Prerequisites, Civil Engineering 51 or 53; Mechanical Engineering 68.

85. DYNAMICS OF MACHINERY.—Gyroscopic effects, governors, dynamic balancing of rotating machinery. Analysis of unbalanced forces in a machine containing parts moving with rotation, reciprocation, and their combination. Elements of vibration theory, vibration isolation, vibration analysis of equivalent masses and shaft systems. Vibration absorbers.

3 class hours.

Credit, 3.

Mr. SOBALA.

Prerequisites, Civil Engineering 52; Mechanical Eng. 68.

86. (II) ADVANCED MACHINE DESIGN.—A continuation of Course 83. Additional elementary parts are studied which combine into the design of complete machines in the latter part of the course.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES.

Prerequisite, Mechanical Engineering 83.

88. (II) STEADY FLOW MACHINERY.—The principles of thermodynamics are applied to steam and internal combustion turbines, condensers, and other heat transfer apparatus. 3 class hours.

Credit, 3.

Mr. SWENSON.

Prerequisites, Mechanical Engineering 64 or 66; Civil Engineering 76.

90. (II) ADVANCED METALLURGY.—Advanced topics in engineering metallurgy, such as the effects of alloying elements in steel, aluminum, magnesium, and copper alloys. The significant properties of, the fabricating methods for, and the applications of ferrous and nonferrous metals. Admission by permission of instructor.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. KEYSER.

Prerequisite, Mechanical Engineering 46.

91. (I) PROFESSIONAL SEMINAR.—For senior and graduate students only. Presentation of papers on various important subjects in the field of mechanical engineering with principal emphasis on recent developments.

Credit, 1.

THE DEPARTMENT.

94. (I) or (II) EXPERIMENTAL MECHANICAL ENGINEERING.—Special work in mechanical engineering for a senior thesis. Admission by permission of instructor.

Credit, 3.

THE DEPARTMENT.

Industrial Engineering

25. (I) MANUFACTURING PROCESSES.—The methods of producing and fabricating the basic engineering materials: metals, cementing materials, ceramics, plastics, rubber, and lumber. Production methods (excluding machining) of metal parts and their assembly in a typical mass production industry is discussed. Laboratory periods involve inspection trips and movies.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. KEYSER.

26. (Summer) TOOL ENGINEERING.—This course includes the determination of the manufacturing operations necessary to produce a finished product. This is followed by consideration of the principles embodied in the design of jigs, fixtures, dies, and gauges necessary to perform each operation. The economics of tooling as influenced by intermittent or continuous type manufacturing and the effect of volume are also included.

3 44-hour weeks.

Credit, 3.

Mr. COSTA.

51. (I) INDUSTRIAL MANAGEMENT.—A course designed to acquaint the student with the principles of industrial engineering and their application to the solution of the problems of industrial plant operation.

3 class hours.

Credit, 3.

Mr. WEAVER.

75. (I) JOB EVALUATION.—A study of the principles used to determine an evaluation of all occupations in order to establish an equitable rating between them, to establish sound wage and salary policies.

3 class hours.

Credit, 2.

Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

76. (I) TIME STUDY.—A study of the principles involved in the establishment of production standards and their application in the management functions of cost accounting, estimating, production control, incentives, budgetary control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. WEAVER.

Prerequisites, Industrial Engineering 75.

77. (I) PRODUCTION CONTROL.—A study of the principles used to regulate production activities in keeping with the manufacturing plan.

3 class hours.

Credit, 3.

Mr. EMERSON.

Prerequisite, Industrial Engineering 51.

78. (II) FACTORY PLANNING AND LAYOUT.—A study of the principles applying to the determination and development of the physical relationship between plant, equipment and operators working toward the highest degree of economy and effectiveness in operation.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. SOBALA.

Prerequisites, Mechanical Engineering 2; Industrial Engineering 51.

80. (II) PLANT BUDGETARY CONTROL.—A study of the principles used to pre-determine expenses for the factors of production and the comparison of results with the estimates to determine and deal with the causes of expense variations as applied by the operating organization in the industrial plant.

3 class hours.

Credit, 3.

Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

82. (II) WORK SIMPLIFICATION.—A study of the principles involved in the simplification of means of doing work and in the application and use of these principles.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. WEAVER.

Prerequisite, Mechanical Engineering 68.

86. (II) INDUSTRIAL MANAGEMENT.—Designed for students other than industrial engineers. A broad course dealing with the many problems encountered in a modern industry. Topics include types of organization, management, plant location, arrangement of equipment, product design, methods of production control, costs, wage payment systems and personnel relations.

3 class hours.

Credit, 3.

Mr. EMERSON.

88. (II) MOTION AND TIME STUDY.—This course covers the combined fields of motion study and time study for junior and senior students outside the industrial engineering field.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SOBALA.

92. (I) PROFESSIONAL SEMINAR.—For seniors and graduate students.

Credit, 1.

ENGLISH

Professor RAND, Professor GOLDBERG, Professor HELMING, Professor TROY, Associate Professor O'DONNELL,† Associate Professor VARLEY, Assistant Professor HORRIGAN,† Assistant Professor LANE, Assistant Professor ALLEN, Assistant Professor WILLIAMS, Assistant Professor KOEHLER, Assistant Professor KAPLAN, Mrs. WRIGHT, Mrs. HOGAN, Mr. BARRON, Mr. CLARK, Mr. MADEIRA, Mr. MACLAINE, Mr. TUCKER, Mr. HAVEN, Mr. SAVAGE.

Composition

1. (I) 2. (II) ENGLISH COMPOSITION.—Intended to teach straight thinking, sound structure, clear and correct expression. Scheduled hours include Speech 3. (I) 4. (II).

2 class hours.

Credit, 2.

THE DEPARTMENT.

81. (I) (II) CREATIVE WRITING.—A course in critical and imaginative composition based upon the examples of standard authors and the experience of the student. It provides an opportunity for work in description, narrative, verse and drama as well as in exposition.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, a mark of A or B in English 2 (U. of M.) or permission of instructor.

† On leave of absence.

83. (I) (II) TECHNICAL WRITING.—For majors in engineering. A course in factual and inductive exposition with special emphasis upon process reports and theses.

2 class hours.

Credit, 2.
Mr. MADEIRA.

Prerequisites, English 1, 2.

84. (II) TECHNICAL WRITING.—For students not majoring in engineering. A course in factual and inductive exposition with special emphasis upon library research and the preparation of reports, and theses.

3 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisites, English 1, 2.

Literature

25. (I) 26. (II) HUMANE LETTERS.—A general reading course based upon a chronological selection of masterpieces: classical, continental, and English.

3 class hours.

Credit, 3.
THE DEPARTMENT.

50. (II) CHAUCER.—A study of Chaucer's development and preeminence as a creative artist and an attempt to appreciate his humanism.

3 class hours.

Credit, 3.
Mr. HELMING.

51. (I) THE RENAISSANCE IN ENGLAND.—A study of various aspects of the Renaissance as revealed in such writers as Spenser, Bacon, Sir Thomas Browne, Burton, and Hobbes. Special emphasis is given to Spenser's *Faerie Queene*.

3 class hours.

Credit, 3.
Mr. TROY.

53. (I) LYRICAL POETRY OF THE RENAISSANCE IN ENGLAND (1954-55).—A study of lyrical poets such as Sidney, Campion, Jonson, Herrick, Lovelace, Suckling, Carew, Donne, Herbert, Vaughn, Crashaw, Traherne and Marvell. Special emphasis is given to the "Metaphysical" tradition. Given in alternate years.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

54. (II) MILTON.—The development of the mind and art of Milton as a Renaissance writer. Emphasis is placed upon *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*.

3 class hours.

Credit, 3.
Mr. GOLDBERG, Mr. HELMING.

55. (I) SHAKESPEARE.—This course is based upon the reading of about twenty-five of Shakespeare's plays, and attempts both to indicate the evolution of the dramatist and to emphasize the various phases of his art.
3 class hours.

Credit, 3.
Mr. RAND.

57. (I) ENGLISH LITERATURE OF THE RESTORATION.—A study of the social problems and literary values of the Restoration period as they reflect in prose, verse, and drama. Emphasis will be placed on the Theater, both tragic and comic, with particular attention to the role of wit, "humours", and satire in the Restoration Comedy of Manners.
3 class hours.

Credit, 3.
Mr. KOEHLER.

58. (II) ELIZABETHAN DRAMATISTS.—A study of English drama from the death of Elizabeth to the closing of the theaters. Special consideration will be given to the plays of Jonson, Beaumont, Fletcher, Webster, Middleton, Massinger, and Shirley.
3 class hours.

Credit, 3.
Mr. O'DONNELL.

59. (I) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A study of the literature of the Augustan Age, with special emphasis on the writing of Swift and Pope.
3 class hours.

Credit, 3.
Mr. TROY.

60. (II) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A continuation of English 59, but may be elected independently. A study of the literature of the later Eighteenth Century with special emphasis on the Johnson Circle.
3 class hours.

Credit, 3.
Mr. TROY.

61. (I) ROMANTIC POETRY (1954-55).—A study of the Lake Poets (primarily Wordsworth and Coleridge) and their precursors. Given in alternate years.
3 class hours.

Credit, 3.
Mr. RAND.

62. (II) ROMANTIC POETRY (1954-55).—A continuation of English 61 but may be elected independently. A study of Byron, Shelley and Keats. Given in alternate years.
3 class hours.

Credit, 3.
MISS HARRIGAN.

63. (I) AMERICAN POETRY.—A study of American poetry from Colonial times to 1900, with special emphasis upon the work of Freneau, Bryant, Emerson, Longfellow, Whittier, Poe, Whitman, and Emily Dickinson.
3 class hours.

Credit, 3.
Mr. O'DONNELL, Mr. ———.

65. (I) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A study of the chief Romantic prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Coleridge, Lamb, Hazlitt, DeQuincey, Carlyle, and Ruskin.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

66. (II) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A continuation of English 65, but may be elected independently. A study of the chief Victorian prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Macaulay, Newman, Arnold, Huxley, Pater, and Stevenson.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

67. (I) AMERICAN PROSE.—A course in the chief American prose writers of the nineteenth and twentieth centuries. Among the authors studied are Emerson, Thoreau, Hawthorne, Melville, Mark Twain, Henry Adams, and Henry James.

3 class hours.

Credit, 3.

Mr. O'DONNELL.

68. (II) MODERN DRAMA.—This course traces the development of English and American drama from the time of Ibsen to the present day. Its purpose is to impart an intelligent and enthusiastic interest in the theatre of the twentieth century.

3 class hours.

Credit, 3.

Mr. RAND, Mr. WILLIAMS.

69. (I) VICTORIAN POETRY (1953-54).—A study of Tennyson and Browning. Given in alternate years.

3 class hours.

Credit, 3.

Mr. RAND.

71. (I) BIOGRAPHY.—The history of the biography as a literary type; discussion of leading biographers from Boswell to Maurois, with special emphasis upon the development of the modern biographical method.

3 class hours.

Credit, 3.

Mr. HELMING.

72. (II) THE BIBLE AS LITERATURE.—A study of the King James version of the Bible, with emphasis upon the Hebrew as discernible in translation, the poetic qualities characteristic of Tudor England, and the varied influence of the Bible upon subsequent English poetry.

Mr. RAND.

73. (I) THE NOVEL FROM DEFOE THROUGH THE VICTORIANS. The development of the novel; the reading and discussion of eight or nine great English novels of the eighteenth and nineteenth centuries.

3 class hours.

Credit, 3.

Mr. ALLEN, Mr. HELMING.

74. (II) GREEK CLASSICS IN TRANSLATION.—Readings and discussion of the epics of Homer, representative dramas of Aeschylus, Sophocles, Euripides, and Aristophanes, the "Socratic" dialogues of Plato, and Thucydides' history of the Peloponnesian War. Intended to acquaint students with the famous myths and stories of classical antiquity, and the literary forms and ideas which have contributed most to subsequent literatures.

3 class hours.

Credit, 3.

Mr. HELMING, Mr. TROY.

76. (II) MODERN POETRY.—This course attempts to trace the spirit of twentieth century poetry from such authors as Hardy, Whitman, and Emily Dickinson to those of the present day.

3 class hours.

Credit, 3.

Mr. RAND, Miss HERRIGAN.

77. (I) THE MODERN NOVEL.—An analytical presentation of eleven novels written between 1890 and 1930, in which the expanding form and the extension of critical themes will be stressed.

3 class hours.

Credit, 3.

Mr. VARLEY.

79. (I) LITERARY CRITICISM (1953-54).—A study of major critical attitudes and principles, in relation to philosophic background and to practice. Emphasis is placed upon important critics and theorists from Plato and Aristotle through those of the eighteenth century. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

80. (II) LITERARY CRITICISM (1953-54)).—A continuation of English 79, but may be elected independently. Emphasis is placed upon important critics and theorists of the nineteenth and twentieth centuries. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

ENTOMOLOGY

Professor ALEXANDER, Professor SWEETMAN, Associate
Professor SHAW, Assistant Professor HANSON,
Dr. SMITH, Mr. FIELD,* Mr. FARR.

26. (II) GENERAL AND FIELD ENTOMOLOGY.—The lectures are devoted to a brief survey of the entire field of entomology; structure and metamorphosis; the more important methods and materials for control of injurious species; a survey of the more conspicuous and important insects with particular attention to the fauna of New England. A laboratory period will be devoted to the preparation and formation of a collection of insects. Until about April 10th, this work will be done indoors and will consist of lectures and practical work preparatory to the field work after that date. Collections made by the students are studied in later courses.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 M. F.; 1:00-2:50 M. Tu. W. Th. F.

Mr. ALEXANDER, Miss SMITH.

51. (I) PESTS OF SPECIAL CROPS.—For students not specializing in entomology who desire a more complete knowledge of the insects connected with their major lines of work. Work in the laboratory consists of identification, life-history studies and control measures of important insect pests. Work of this nature is available on pests of field crops, market-garden crops, fruits, flowers, shade trees and shrubs, forest trees, household articles, domestic animals, and man.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 M.; 1:00-2:50 Tu.; 2:00-3:50 Th. Mr. SHAW.

Prerequisite, Entomology 26.

53. (I) APPLIED ENTOMOLOGY.—Studies on the more important insect pests, their life-histories, damage, identification, and methods of control. Special attention is devoted to the use of entomological literature, methods of preparing scientific papers, and the general principles of insect control.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 W.; 3:00-4:50 M. F. Mr. FARR.

Prerequisite, Entomology 26.

55. (II) 56. (II) CLASSIFICATION OF INSECTS.—Laboratory work on the identification of the major orders of insects. In Course 56, the immature stages of insects, with particular stress on their structures and recognition.

3 2-hour laboratory periods. Credit, 3.
8:00-9:50 Tu. Th. S. Mr. ALEXANDER, Miss SMITH.

Prerequisites, Entomology 26; Entomology 57, previously or concurrently.

* On leave of absence for military service.

57. (I) INSECT MORPHOLOGY.—The lectures treat of the external and internal anatomy, particularly of the major orders, stress being placed upon the phylogenetic relationships, as background for parallel and subsequent work in taxonomy and physiology of insects.

1 class hour; 3 2-hour laboratory periods.

Credit, 4.

10:00-10:50 F.; 1:00-2:50 M. Tu. F.

Mr. HANSON.

Prerequisite, Entomology 26.

60. (II) STRUCTURAL PEST CONTROL.—For students specializing in entomology, especially those desiring to enter the structural pest field, and others interested in gaining knowledge of methods of combating insect and rodent pests. The emphasis will be placed on the control of those pests attacking buildings and other structures, foods, fabrics, and other stored products in private homes or other establishments. The life history, feeding habits, methods of reproduction, and dispersal of the various species will be stressed in so far as these influence control measures.

2 class hours.

Credit, 2.

11:00-11:50 M. F.

Mr. SWEETMAN.

Prerequisite, Zoology 1; Entomology 26 desirable.

72. (II) FOREST AND SHADE TREE INSECTS.—The lecture work deals with the principles and methods of controlling insects which attack shade trees, forests and forest products. The laboratory periods are devoted to a study of the more important species, their identification, biology, and specific control measures.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 1:00-2:50 M. F.

Mr. HANSON, Mr. FIELD.

Prerequisite, Entomology 26; 53, 55, 56, and 57 desirable.

74. (II) MEDICAL ENTOMOLOGY.—The relationships of insects and their allies to the health of man and animals. The classification, biology and control of these pests is studied in detail.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 W.; 3:00-4:50 Tu. Th.

Mr. SHAW.

Prerequisite, Entomology 26.

79. (I) ANIMAL ECOLOGY.—Designed for students specializing in entomology, zoology, and related fields. The course deals with the relation of animals to their environment, covering the physical factors as temperature, moisture, light, etc., and biotic factors as neighbors, competitors, predators, etc. Both terrestrial and aquatic communities are studied. The student is shown not only that animals do things, but why they make definite responses to the environmental factors.

Actual measurements of the environmental factors and responses of the animals in the field and laboratory are included.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 M. F.; 3:00-4:50 M. Mr. SWEETMAN.

Prerequisite, Entomology 26 or Zoology 1 or equivalent.

80. (II) INSECT CONTROL.—The scientific basis of insect control is considered from the chemical, biological, ecological, mechanical, and legislative approaches. Special emphasis is placed on the composition, manufacture, preparation, and reaction of insecticides, and the use of resistant hosts, micro-organisms and the larger parasites and predators that might be used in the control of insects.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

9:00-9:50 M.; 3:00-4:50 M. F. Mr. SWEETMAN.

Prerequisites, Entomology 53, 55, and 57; 79 and 81 desirable.

81. (I) PHYSIOLOGICAL ENTOMOLOGY.—A detailed consideration is given to the organ systems, showing the functions such as nutrition, respiration, and growth, and the relationship of physiology to behavior. A portion of the laboratory time will be devoted to assigned individual problems dealing with any phase of insect biology or control and conducted on a research basis.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

9:00-9:50 M.; 3:00-4:50 M. F. Mr. SWEETMAN.

Prerequisite, Entomology 26; 55, 56, and 57 desirable.

87. (I) 88. (II) SPECIAL PROBLEMS IN ENTOMOLOGY.—Problem work in many fields, as apiculture, biological control and insectary practice, insecticides, morphology, and classification. Intended primarily to introduce qualified students to research methods in some branch of entomology. Excess departmental credits are necessary for election.

Hours by arrangement.

Credit, 1, 2, or 3.

THE DEPARTMENT.

Prerequisites, Entomology 26, 53, 55, 57, and should be preceded or accompanied by any other courses in the restricted field of the problem.

89. (I) ENTOMOLOGICAL TECHNIQUES.—Theory and practice in the preservation, preparation, and mounting of insects for study and display. Excess departmental credits are necessary for election.

2 2-hour laboratory periods.

Credit, 2.

Hours by arrangement.

Miss SMITH.

Prerequisites, Entomology 26 and permission of instructor.

90. (II) EVOLUTION.—The phylogeny of plants and animals is outlined at some length in conjunction with consideration of factors and forces influencing and guiding

evolution. Especial consideration is given throughout the course to the implications and applications of evolutionary concept to human behavior, welfare and philosophy.

2 class hours.

Credit, 2.

10:00-10:50 M. F.

Mr. HANSON.

Apiculture

66. (II) INTRODUCTORY BEEKEEPING.—The laboratory work consists of a study of beekeeping equipment and the methods of assembling this material; a study of pollen and honey plants; spring management. The lectures are intended to give the student a broad grasp of the entire field of beekeeping, considering such subjects as history; statistics of beekeeping in America; the races of bees; methods of management; bee-diseases; pollination; queen-rearing.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 M. F.; 1:00-2:50 M.

Mr. SHAW.

85. (I) ADVANCED BEEKEEPING.—The laboratory work consists of fall management, care of the honey crop, preparation of colonies for wintering, bee-diseases, and some simple types of biometrical problems. The lectures consider, among other things, the physical and chemical characteristics of honey and wax; chemical tests to detect adulteration of honey; bee-diseases and biometry.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SHAW.

Prerequisite, Entomology 66.

FINE ARTS

Associate Professor ALVIANI, Mr. CONTINO.

Art

27. MODELING.—A course in elementary modeling, of seeing, analyzing, and reproducing form in clay and modeling wax to develop sculptural technique.

6 laboratory hours.

Credit, 3.

Mr. McLINDON.

28. MODELING.—A continuation of Course 27 in advanced design and the making of plaster casts from original problems in small sculpture, such as plaques, masks, and medals or other such pieces.

6 laboratory hours.

Credit, 3.

Mr. McLINDON.

Prerequisite, Art 27.

31. (I) ELEMENTARY DESIGN.—For women. Elementary principles of design as applied to textiles, fabrics, interior decorations, etc.

3 2-hour laboratory periods.

Credit, 3.

Mr. MACIVER.

33. (I) FREEHAND DRAWING.—A non-professional course in elementary drawing and painting in various media in black and white. The work is more or less personal and is adapted to the individual capacities and backgrounds of each student as far as possible.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

34. (II) FREEHAND DRAWING.—This non-professional course is essentially one in which the use of color is stressed in various media, freehand drawing is emphasized and paintings in still-life and landscape subjects are produced.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

75. (I) ART APPRECIATION.—An analysis of the principles of critical judgment underlying the fine arts, leading toward the enjoyment of art and its application to every day life.

3 class hours.

Credit, 3.

Mr. OTTO.

77. (I) EARLY AND MEDIEVAL ART.—An appreciative survey of art and history from early times through the medieval period. Works in painting, sculpture, architecture, and the minor arts are examined in the light of their contributions to the history of civilization, and to the development of art forms.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. ———.

78. (II) RENAISSANCE AND MODERN ART.—This course is a continuation of Art 77, bringing the historical survey of art down to modern times. While it is advisable to take both courses, either may be elected independently.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. ———.

Music

25. (I) 26. (II) ELEMENTARY INSTRUMENTAL OR VOCAL ENSEMBLE.—Admission by permission of instructor. Not open for credit to freshmen, to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. This course is designed to improve the playing of instruments and/or the use of the singing voice, and to create further appreciation of music by the most direct of teaching methods—actual performance. Students electing this course should take both 25 and 26.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

27. (I) 28. (II) **INTERMEDIATE INSTRUMENTAL OR VOCAL ENSEMBLE.**—Not open for credit to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. A continuation of Music 26, for the training of performers in small groups, such as string quartet, two piano, and/or mixed vocal octet, female trio, etc. Students electing this course should take both 27 and 28.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 26.

29. (I) 30. (II) **ADVANCED INSTRUMENTAL OR VOCAL ENSEMBLE.**—Not open for credit to those taking Music 55 and 56 concurrently, or to those who concurrently are members of organized university musical clubs. This course presents to the student various techniques of solo performance, of program planning, and of teaching beginners in vocal or instrumental music. Those electing this course should take both 29 and 30.

1 class hour.

Credit, 1.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 28.

51. (I) **DISCOVERING MUSIC.**—This elementary course is non-technical in nature and is designed primarily for those students who would like to acquire a general background and knowledge of this great art. With learning to listen its motive, the course deals with the elements of music, forms in music, musical compositions, and with selected composers. Excerpts from the works of great masters will be used as illustrations.

3 class hours.

Credit, 3.

10:00-10:50 or 11:00-11:50 M. W. F.

Mr. ALVIANI.

52. (II) **GREAT PERIODS OF MUSIC.**—This course attempts to transport the student into the spirit of each of several great periods of music—Renaissance, Baroque, Classic, Romantic, and Modern—so that he will feel their quality, understand their enthusiasms, their technical resources and limitations, and their habits of thought and style.

3 class hours.

Credit, 3.

1:00-1:50 or 2:00-2:50 Tu. W. Th.

Mr. ALVIANI.

Prerequisite, Music 51.

55. (I) **ORGANIZATION AND DIRECTION OF CHORAL GROUPS.**—The aim of this course is to demonstrate the methods of developing school and community choral groups. Conducting techniques are taught and factors of good vocal performance are studied. The student will conduct choral groups during the term. Previous musical experience is desirable.

2 class hours.

Credit, 2.

4:00-4:50 W., one hour by arrangement.

Mr. ALVIANI.

56. (II) ORGANIZATION AND DIRECTION OF INSTRUMENTAL GROUPS.—The student is introduced to the different types of instrumental music, the problems of balancing instrumentation, and to the functioning of orchestral instruments. Conducting techniques will be practiced before instrumental groups of various sizes. Previous musical experience is desirable.

2 class hours.

Credit, 2.

4:00-4:50 W., one hour by arrangement.

Mr. CONTINO.

61. (I) GREAT MASTERPIECES OF MUSIC.—The course includes the history and analysis of selected compositions most frequently heard in the concert hall, on records, and on the radio. The selected works will be masterpieces composed during the last two hundred years by the best known composers.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. ALVIANI.

Prerequisite, Music 51 or 52 or permission of instructor.

62. (II) TEACHING OF MUSIC IN THE ELEMENTARY GRADES.—The principles of musical development are studied with particular emphasis on presentation in the classroom. Although the course is designed primarily for those preparing to teach in the elementary grades, others may elect it upon approval of the instructor.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. CONTINO.

75. (I) FUNDAMENTALS OF MUSIC.—This is a correlated study of theory, written and keyboard harmony, ear training, form and analysis. These fundamentals are studied to improve the student's musical appreciation. The course is non-technical in its approach and no previous musical experience is required.

3 class hours.

Credit, 3.

1:00-1:50 M. W. F.

Mr. ALVIANI, Mr. CONTINO.

76. (I) FUNDAMENTALS OF MUSIC.—A continuation of Music 75. More detailed musical examples are used and further study of the musical fundamentals is made. Primarily, the student will develop more mature consideration of the multifarious musical forms and techniques.

3 class hours.

Credit, 3.

11:00-11:50 Tu., 12:00-12:50 W. Th.

Mr. ALVIANI, Mr. CONTINO.

Prerequisite, Music 75.

FLORICULTURE

Professor THAYER, Assistant Professor HUBBARD, Assistant Professor ROSS, Mr. DUNHAM, Mr. IVES.

26. (II) GARDEN MATERIALS.—A study of the annuals, biennials, herbaceous perennials, bulbs, bedding plants, and roses that are valuable for use in floricultural or landscape gardening work. Methods of propagation, culture, and uses of the various plants are considered as well as identification of materials.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 M. F.; 3:00-4:50 Th. Mr. DUNHAM.

51. (I) GREENHOUSE MANAGEMENT.—This course is intended to familiarize students with the methods and principles involved in the management of greenhouses and greenhouse crops; history and development of the floricultural industry, preparation of soils, fertilizers, potting, watering, ventilation, control of insects and diseases, methods of plant propagation, forcing plants, soilless methods of plant culture. At some time during the semester the members of the class will be required to take a one-day trip to visit large commercial establishments at an approximate cost of five dollars.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 M. F.; 1:00-2:50 F. Mr. THAYER, Mr. DUNHAM.

52. (II) FLORAL ARRANGEMENT.—A study of the principles involving the arrangement and use of cut flowers and plants; funeral designs, basket and vase arrangements, corsages, wedding bouquets, table decorations, home, church, and other interior decorations. A study of color and color harmony as applied to such work. This course is limited to ten students, preference being given to students specializing in floriculture and landscape architecture.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. THAYER, Mr. ROSS.
8:00-8:50 Th.; 1:00-2:50 M. F.

54. (II) GREENHOUSE CONSTRUCTION AND HEATING.—The location, types, arrangement, construction, cost, equipment, heating, and ventilation of greenhouse structures; the drawing of plans and study of specifications. Special emphasis laid on heating problems.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 M. F.; 3:00-4:50 M. Mr. THAYER, Mr. DUNHAM.

58. (II) AMATEUR FLORICULTURE.—This course is intended primarily for major students in the School of Home Economics and for other women students. Three phases of floriculture will be considered: (1) the arrangement and use

of cut flowers for decorative purposes in the home and elsewhere, (2) house plants, methods of propagation, (3) garden flowers and their uses on the home grounds.

2 class hours; 1 2-hour laboratory period. Credit, 3.

10:00-10:50 Tu. Th.; 3:00-4:50 Tu. or 1:00-2:50 Th.

Mr. THAYER, Mr. ROSS.

75. (I) 76. (II) COMMERCIAL FLORICULTURE,—A detailed study of the cultural methods for the important commercial cut-flower crops and potted plants. The marketing of flowers and plants, including the management of wholesale markets and retail stores, a study of systems of record keeping, cost analysis, inventory methods, and other phases of this important part of the floricultural industry. Trips may be taken to nearby commercial establishments.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 Tu., Th.; 1:00-2:50 Tu. Mr. HUBBARD.

Prerequisite, Floriculture 51.

79. (I) CONSERVATORY PLANTS (1954-55).—Alternates with Course 81 for students specializing in floriculture. A study of the foliage and flowering plants used in conservatory work; methods of propagation; identification of materials.

1 class hour; 1 2-hour laboratory period. Credit, 2.

12:00-12:50 Th.; 1:00-2:50 M.

Mr. THAYER, Mr. DUNHAM.

81. (I) HERBACEOUS GARDENS AND BORDERS.—Alternates with Course 79 for students specializing in floriculture; given annually for students specializing in landscape architecture. This course is a continuation of Course 26 with emphasis on the use of herbaceous materials in various types of planting of borders and gardens.

1 class hour; 1 4-hour laboratory period. Credit, 3.

10:00-10:50 Tu.; 1:00-4:50 Th. Mr. HUBBARD.

Prerequisite, Floriculture 26.

82. (II) SEMINAR.—For seniors specializing in floriculture. Presentation and discussion of research work in floriculture and other related fields.

1 class hour; 4 laboratory hours. Credit, 3.

11:00-11:50 W.; laboratory hours by arrangement.

THE DEPARTMENT.

FOOD TECHNOLOGY

Professor FELLERS, Associate Professor LEVINE, Assistant
Professor CULBERTSON, Dr. FITZPATRICK,* Mr. FELICIOTTI.
Mr. WESTCOTT.

51. (I) **INTRODUCTORY COURSE**.—This is a general elementary course covering food economics, production, distribution and processing. The applications of fundamental science to the food industries are pointed out. The laboratory exercises cover both the theory and practice of canning, freezing and dehydration. The principles of packaging are considered. Fruit and vegetable products are prepared and graded.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu., Th.; 1:00-2:50 W. or Th. Mr. FELLERS.

52. (II) **FOOD PRODUCTS AND ADJUNCTS**.—This is a continuation of Course 51. The laboratory work includes pickles and pickle products, maple products, citrus products, fruit syrups, soups, condiments, and the preservation of meats, poultry, and vegetables. The properties and uses of sugars, syrups, brines, enzymes, acids, salt, pectin, preservatives and antioxidants are considered. Experience is given in the use and handling of instruments and equipment. Enrollment is limited to 25.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu., Th.; 1:00-2:50 W. or Th. Mr. FELLERS.

Prerequisite, Food Technology 51.

61. (I) **INDUSTRIAL TECHNOLOGY**.—A survey of commercial practices in the manufacture and preservation of food products. This will involve a study of equipment, factory arrangement, sanitation, government regulations, and the operation of types of commercial equipment in quantity production.

1 class hour; 1 4-hour laboratory period. Credit, 3.
10:00-10:50 Th.; 1:00-4:50 M. or Tu. Mr. LEVINE.

Prerequisites, Food Technology 52; Bacteriology 31.

62. (I) **INDUSTRIAL TECHNOLOGY**.—This is a continuation of Course 61. The class exercises will deal largely with a survey study of the sources of raw material, commercial methods of manufacture, packing and distribution of the more common foods. The important contributions of research to food technology will be studied. Laboratory work will include the formation of research projects, interpretation of research data, the use of preservatives, the simple analysis of foods and the commercial practices as applied to preservation of such materials as are available: fish, meats, poultry, and spring vegetables. The inspection and grading of canned

* On leave of absence for military service.

food will be studied. Sometime during the semester a two-day field trip to food plants in the Boston area will be taken. The trip will cost the student about fifteen dollars.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. LEVINE.

Prerequisite, Food Technology 61.

71. (I) 72. (II) FOOD SCIENCE LITERATURE.—For seniors who specialize in food technology.

2 class hours.

Credit, 2.

11:00-11:50 M. W.

THE DEPARTMENT.

75. (I) and (II) FOOD PRESERVATION.—For students not majoring in food technology. A survey is made of the causes of food spoilage and of the methods commonly used in preserving foods. The important food products are discussed with emphasis on raw materials used, processing methods and examination of packaged foods. Methods of detecting and preventing spoilage are studied. The laboratory exercises cover the preservation of the major food groups. The theory and use of the pressure cooker are included.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

12:00-12:50 Tu. Th.; 3:00-4:50 M. or Th.

Mr. ———.

82. (II) CONFECTIONS AND CEREAL PRODUCTS.—The materials offered in this course are as follows: the home manufacture of fruit preserves, candied and glacéed fruits, pastes, confections, candies, and other specialties. Approximately one-half the semester is devoted to elementary work in candy making. This course will also consider the principles of baking, doughs, various cereal products and dry mixes.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 M. F. or 3:00-4:50 M. F.

Mr. LEVINE.

85. (I) 86. (II) MARINE PRODUCTS TECHNOLOGY.—A survey of marine products of commerce and industry. Canning, curing, and freezing of seafoods. Chemical and microbiological aspects of the industry. By-products, industrial problems and scientific literature. Emphasis is placed on the New England fisheries.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

Mr. FELLERS

91. (I) ANALYSIS OF FOOD PRODUCTS.—Laboratory studies on the grading of foods, examination of foods for adulteration, testing accessory products for quality, and determining the causes of spoilage or deterioration in processed food products.

Physical, chemical, microbiological, and microscopical methods will be employed. Enrollment limited to 18.

1 class hour; 1 4-hour laboratory period. Credit, 3.
9:00-9:50 Th.; 1:00-4:50 Th. or F.

Mr. FELLERS, Mr. LIVINGSTON.

Prerequisites, Food Technology 52; Bacteriology 31; Chemistry 30.

92. (II) EXAMINATION OF FOOD PRODUCTS.—For students specializing in food technology. This is a continuation of Course 91. It includes interpretation of analysis, sanitation and food laws, government grading of processed foods, use of manuals and the technical work of trade associations. Laboratory work includes use of all kinds of laboratory and field equipment and apparatus used in food plants. A separate laboratory section is given for Bacteriology and Public Health majors.

1 class hour; 1 4-hour laboratory period. Credit, 3.
9:00-9:50 Th.; 1:00-4:50 Th. or F.

Mr. FELLERS, Mr. LIVINGSTON.

Prerequisite, Food Technology 91.

95. (I) and (II) INTRODUCTORY RESEARCH METHODS.—For food technology majors. The application of the fundamental sciences to food technology research.

Hours by arrangement. Credit, 2.

THE DEPARTMENT.

FORESTRY AND WILDLIFE MANAGEMENT

Professor HOLDSWORTH, Professor TRIPPENSEE, Professor RHODES, Associate Professor RICH, Assistant Professor STICKEL, Mr. COLE,* Mr. GANLEY, Mr. MACCONNELL.

26. (II) DENDROLOGY.—The taxonomic features, silvical characteristics and geographical distribution of the principal forest trees of temperate North America, and the description of the forests in which they occur; identification of the native and naturalized woody plants occurring in the forests of the Northeastern United States, in summer and winter condition, by means of keys and first-hand examination.

2 class hours; 2 2-hour laboratory and field periods.

Credit, 3.

Mr. RHODES, Mr. GANLEY.

51. (I) FOREST MANAGEMENT OF WATERSHEDS.—For students majoring in bacteriology and public health. Admission on recommendation of student's major adviser. A study of forest site—water factor relationships; the improvement of

* On leave of absence for military service.

watershed forests through applied silviculture; relative suitability of tree species for watershed uses; forest protection measures.

3 class hours; special field trips.

Credit, 3.

THE DEPARTMENT.

52. (II) AERIAL PHOTOGRAMMETRY.—A course designed to familiarize the student with the use of aerial photographs in present-day forest management practice. Map making, forest inventory and other phases of forest management involving the application of photogrammetry are considered in detail. Field trips for checking photographic detail on the ground will be made. Texts and equipment costing about \$10.00 are required.

2 class hours; 1 4-hour laboratory period.

Credit, 3.

Mr. MACCONNELL, Mr. GANLEY.

53. (I) SILVICS.—Forest ecology as a foundation for silvicultural practice: the physiological basis of forest ecology; environmental factors, their effect upon vegetation, and how they are influenced by it; the development and silvical habits of the individual tree; the development, characteristics and classification of forest communities; plant indicators; methods for the study and analysis of vegetation and its environment. 2 class hours; 1 4-hour laboratory and field period.

Credit, 3.

Mr. RHODES.

54. (II) FOREST SOILS.—The structure, development and maintenance of forest soils; their relationship to applied silviculture and forest productivity; the literature of forest soils with special reference to American experience.

3 class hours.

Credit, 3.

Mr. RHODES.

55. (I) and (Summer) THE ELEMENTS OF FOREST MENSURATION.—Methods of determining the volume and value of the forest growing stock; type mapping as it pertains to timber cruising; methods of predicting growth of trees and stands; the field work includes mapping and timber estimating on a forest realistic in size and condition and the submission of an inventory report.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.

Summer course: 3 44-hour weeks.

Mr. HOLDSWORTH, Mr. COLE.

56. (II) THE PRINCIPLES OF SILVICULTURE.—The methods of establishing and developing forest stands through the application of correct silvicultural practice. Intermediate cuttings and reproduction systems. Field work in applied

silviculture, including the marking of forest stands for silvicultural treatment, is given on University forest property.

2 class hours; 1 4-hour laboratory period.

Credit, 3.

Mr. RHODES, Mr. ———.

57. (I) FOREST ECONOMICS AND POLICY.—This course considers the forest as a resource yielding direct forest values and social benefits. The history of American forestry and the development of a forest policy together with the role of the forest in American economy are considered.

3 class hours.

Credit, 3.

Mr. HOLDSWORTH.

59. (I) FOREST PROTECTION.—The principle of protecting forests from all harmful agencies but with special reference to the prevention and control of forest fires, insects, and disease. Other agencies are treated in accordance with their importance.

3 class hours.

Credit, 3.

Mr. STICKEL.

66. (II) WOOD ANATOMY AND IDENTIFICATION.—A basic anatomical study of wood elements, their various structural characteristics and functions. Relation of structure and properties to use. Microscopic study of wood elements. Practice in identification.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. RICH.

75. (I) MANUFACTURE AND DISTRIBUTION OF FOREST PRODUCTS.—A study of the techniques of manufacturing direct forest products, including production and cost studies; also the seasoning, grading and special processing prerequisite to marketing.

3 class hours.

Credit, 3.

Mr. RICH.

76. (II) WOOD TECHNOLOGY.—The structure, composition and properties of wood in relation to its economic utilization; wood-liquid relationships as they affect seasoning, preservation, and technological process for industrial purposes. A survey of the technological advances in the use of wood.

3 class hours.

Credit, 3.

Mr. RICH.

78. (Summer) HARVESTING OF FOREST PRODUCTS.—Primarily a field course designed to give students practice in the actual harvesting and preparation of direct forest products from the felling of standing timber through the log-making, skidding, transportation and sawing processes to the stacking of lumber. This part of the course is given on University

owned forest land and at the mill of a private cooperator. Short field trips are made to active forest properties where harvesting is proceeding and a longer trip is made to New Hampshire and Maine to visit pulpwood operations and manufacturing plants. Lectures and classwork survey the theory and practice of forest harvesting in the several U. S. forest regions.

3 44-hour weeks.

Credit, 3.

Mr. GANLEY, Mr. ———.

80. (II) PRINCIPLES OF FOREST MANAGEMENT.—The organization of the forest for sustained yield management with a study of the underlying principles. Forest regulation. The preparation of forest management plans.

2 class hours; 1 4-hour field and laboratory period.

Credit, 3.

Mr. MACCONNELL.

81. (I) REGIONAL SILVICULTURE.—The practice of silviculture as applied in the several forest regions of the United States with special reference to the treatment of the tree species of commercial importance. Emphasis is given to the factors, both natural and economic, which govern silviculture in these regions.

3 class hours.

Credit, 3.

Mr. RHODES.

82. (II) SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY.—A study of forest tree seeds and their characteristics, production, harvest, storage, and qualities of germination. The production, distribution, and forest use of planting stock.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. STICKEL.

85. (I) AIR SEASONING AND KILN DRYING.—A study of the proper conditioning of wood products by air seasoning and kiln drying. Laboratory work includes studies of moisture relations in the wood and a study of kiln operation.

3 class hours.

Credit, 3.

Mr. RICH.

Wildlife Management

27. (I) CONSERVATION OF NATURAL RESOURCES.—Natural resources of the United States including soil, water, forests, wildlife, and the important minerals, the historic background of their use and their present status in relation to the social and economic welfare. Includes the discussion of various conservation problems in relation to national prosperity.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. TRIPPENSEE.

70. (II) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of common game birds and mammals. Includes a study of natural habitats and methods of management.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
3:00-4:50 W. F.; lecture by arrangement.

Mr. TRIPPENSEE.

71. (I) WILDLIFE MANAGEMENT (1952-53).—Life histories, ecology, and management of waterfowl. Includes a study of natural habitats and method of management. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Mr. TRIPPENSEE.

72. (II) FOREST-ANIMAL RELATIONSHIPS.—For students majoring in Forestry. Effects of animals on the forest; the effects of forest practices on wild animal production; economic aspects of forest-animal relationships.

3 class hours. Credit, 3.
10:00-10:50 M. W. F.

Mr. TRIPPENSEE.

73. (I) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of predaceous birds and injurious mammals. Particularly designed for those who seek employment with rodent control division of Fish and Wildlife Service.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. TRIPPENSEE.

74. (II) TECHNIQUES IN WILDLIFE MANAGEMENT (1952-53).—Admission by permission of instructor. Quantitative field studies of wild animals of forest and farm. Includes cover mapping, habitat studies, census, food habits, and damage of game animals. For students interested in state and federal employment through civil service. Given in alternate years.

1 class hour; 1 4-hour laboratory period. Credit, 3.
1:00-1:50 W.; 1:00-4:50 M.

Mr. TRIPPENSEE.

75. (I) WILDLIFE MANAGEMENT (1953-54).—Life histories, ecology, and management of the furbearers. Includes a study of natural habitats, management and fur farm problems. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Mr. TRIPPENSEE.

84. (II) SEMINAR (1953-54).—Study and discussion of problems in relation to agriculture, forestry, and the use and control of wildlife resources. For juniors and seniors majoring in wildlife management. Given in alternate years.

3 class hours. Credit, 3.
Mr. TRIPPENSEE.

GEOLOGY AND MINERALOGY

Professor WILSON, Assistant Professor NELSON,
Mr. JOHANSSON, Mr. LIGHT, Mrs. ROTAN, Mr. DUTCHER.

27. (I) PHYSICAL GEOLOGY.—An introduction to the agents and processes that modify the earth's crust. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

28. (II) HISTORICAL GEOLOGY.—A survey of geological time, stressing the development of continents and the history of plants and animals. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

50. (I) ENGINEERING GEOLOGY.—A general course in engineering geology stressing earth structure, the dynamic processes, and agents of weathering. The laboratory work consists of mineral and rock-determination and map-reading as related to the phenomena of physical geology.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. LIGHT.

51. (I) MINERALOGY.—A descriptive study. Stress is placed upon the identification and occurrence of minerals.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. NELSON.

52. (II) PETROLOGY.—A descriptive study of the classes of rocks with reference to manner of origin, modes of occurrence, structural features and the chemical and petrographic distinction within each group.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. NELSON.

54. (II) ECONOMIC GEOLOGY.—A course dealing with the origin, classification, and uses of metallic and non-metallic mineral deposits.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. LIGHT.

61. (I) GEOMORPHOLOGY (1952-53).—A review of recent studies concerning rock structures, weathering, underground water, streams, alpine and continental glaciers, shorelines, and wind work. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. WILSON.

62. (II) GEOMORPHOLOGY (1952-53).—A review of recent studies concerning the physical geological role of organisms, coastal plains, plains and plateaus, volcanoes, dome, block, folded and complex mountains. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. WILSON.

63. (I) INVERTEBRATE PALEONTOLOGY.—A study of the history, development and identification of invertebrate animal fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. JOHANSSON.

64. (II) PLANT PALEONTOLOGY.—A study of the history, development, and identification of plant fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. WILSON.

71. (I) 72. (II) SPECIAL PROBLEMS.—For seniors specializing in geology.

6 laboratory hours.

Credit, 3.

Hours by arrangement.

THE DEPARTMENT.

73. (I) STRUCTURAL GEOLOGY (1954-55).—A study of the origin of rock structures, their occurrence, and recognition. Field and laboratory problems emphasize the structure present in the Connecticut valley. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. LIGHT.

74. (II) PRINCIPLES OF STRATIGRAPHY (1953-54).—An examination of the principles of stratigraphic correlation and their application to the problems of the major rock units of the United States. Field and laboratory work consists primarily of problems related to the eastern United States. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. WILSON.

GERMAN

Professor ELLERT, Associate Professor GOLDSMITH, Assistant Professor SCHROEDER, Mr. STAWIECKI, Mr. LEA, Mr. WILBUR.

1. (I) 2. (II) ELEMENTARY GERMAN.—Grammar, prose composition, and reading. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours.

Credit, 3.

THE DEPARTMENT.

5. (I) 6. (II) ADVANCED GERMAN PROSE.—Reading of representative German authors. Grammar review.

3 class hours.

Credit, 3.

8:00-8:50 Tu. Th. S.

Mr. STAWIECKI.

Prerequisite, Entrance German.

25. (I) 26. (II) INTERMEDIATE GERMAN.—German prose and poetry; the simple German drama; grammar review and advanced prose composition. Simpler passages of prose and poetry to commit to memory.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, German 1 and 2.

51. (I) 52. (II) NINETEENTH CENTURY LITERATURE.—A survey of German thought in the Nineteenth Century.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. ELLERT.

Prerequisites, German 25 and 26.

55. (I) 56. (II) "STORM AND STRESS" AND ROMANTICISM.—The "Storm and Stress" period of German literature, with study of the early plays of Goethe and Schiller. The Romantic period from Novalis to Heine, with study of poets, prose writers, critics, and philosophers.

3 class hours.

Credit, 3.

10:00-10:50 Tu. Th., 2:00-2:50 F.

Mr. ELLERT.

Prerequisites, German 25 and 26.

57. (I) 58. (II) GOETHE'S FAUST.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. ELLERT.

Prerequisites, German 25 and 26.

59. (I) 60. (II) THE CLASSICAL PERIOD.—Reading and study of some important literary productions of the classical period.

3 class hours.

Credit, 3.

8:00-8:50 Tu. Th. S.

Mr. GOLDSMITH.

Prerequisites, German 25 and 26.

79. (I) 80. (II) CONVERSATIONAL GERMAN.—Admission only by arrangement with the head of the department. Practice in the oral use of German, based on reading material prepared in advance.

3 class hours.

Credit, 3.

3:00-4:50 Tu. Th.

THE DEPARTMENT.

Prerequisites, German 25 and 26.

81. (I) 82. (II) SCIENTIFIC GERMAN.—Only seniors admitted, except by permission of the instructor. Intensive

and specialized reading of literature taken from standard German scientific journals and reference books.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. MORGAN.

Prerequisites, German 25 and 26.

GOVERNMENT

Assistant Professor FERWERDA,* Assistant Professor GOODWIN,
Mr. MATTHEWS, Mr. ALLEN, Mr. TINDER.

25. (I) and (II) AMERICAN GOVERNMENT.—A study of the principles, machinery, dynamics and problems of American national government.

3 class hours.

Credit, 3.

THE DEPARTMENT.

28. (II) STATE AND LOCAL GOVERNMENT.—A survey of the governmental structure and functions of the American state and its local governments, with emphasis on state-local relationships.

3 class hours..

Credit, 3.

THE DEPARTMENT.

52. (II) EUROPEAN GOVERNMENT.—A comparative study of the politics and institutions of Great Britain, France, Russia, and other European governments.

3 class hours.

Credit, 3.

Mr. ALLEN.

61. (I) PUBLIC ADMINISTRATION.—A general survey of the field of public administration. Special emphasis will be placed on the principles of organization, the functions performed by administration, and the relation of administration to democracy.

3 class hours.

Credit, 3.

Mr. MATTHEWS.

62. (II) ADMINISTRATION LAW.—A study of government regulatory activities in relation to industry, agriculture, and labor, with emphasis on the legal framework within which these activities operate.

3 class hours.

Credit, 3.

Mr. FERWERDA.

63. (I) POLITICAL PARTIES AND ELECTIONS.—A study of the American political process, with emphasis on parties, pressure groups, and public opinion.

3 class hours.

Credit, 3.

Mr. GOODWIN.

* On leave of absence for military service.

64. (II) MUNICIPAL GOVERNMENT.—A survey of the governmental structure and function of American municipalities. Special attention is given to such functions as protection, education, welfare, correction, city planning and zoning.

3 class hours.

Credit, 3.

Mr. GOODWIN.

65. (I) CONSTITUTIONAL LAW.—An historical study of American Constitution as interpreted by decisions of the Supreme Court.

3 class hours.

Credit, 3.

Mr. GOODWIN.

66. (II) AMERICAN POLITICAL THOUGHT.—A study of the development of American political thought from colonial times to the present.

3 class hours.

Credit, 3.

Mr. MATTHEWS.

67. (I) INTERNATIONAL GOVERNMENT.—A study of international organization in the twentieth century, with emphasis upon the United Nations and regional organizations.

3 class hours.

Credit, 3.

Mr. ALLEN.

68. (II) INTERNATIONAL LAW.—A study of the origin, character, and function of international law.

3 class hours.

Credit, 3.

Mr. FERWERDA.

71. (I) ANCIENT AND MEDIEVAL POLITICAL THOUGHT.—A study of the development of political thought and its relation to cultural and institutional growth from the time of the Greeks to the end of the Middle Ages.

3 class hours.

Credit, 3.

Mr. TINDER.

72. (I) MODERN POLITICAL THOUGHT.—A study of the development of political thought and its relation to cultural and institutional growth from the rise of the modern state to the present.

3 class hours.

Credit, 3.

Mr. TINDER.

93. (I) 94. (II) SEMINAR.—A study of special problems in the field of government. For seniors only.

3 class hours.

Credit, 3.

THE DEPARTMENT.

HISTORY

Professor CALDWELL, Professor CARY, Assistant Professor
DAVIS, Assistant Professor ZEENDER, Assistant
Professor PFLANZE, Mr. POTASH, Mr. GAGNON,
Mr. KINGDON, Mr. SOLT.

5. (I) 6. (II) MODERN EUROPEAN CIVILIZATION.—The first semester covers the period from the later Middle Ages to 1815; the second semester, the period from 1815 to the present. These courses are required of candidates for the B.A. degree but may be elected independently by other students.

THE DEPARTMENT.

31. (I) 32. (II) ENGLISH HISTORY.—Emphasis on economic, social, and cultural influences, as well as on constitutional development. Either semester may be elected independently.

3 class hours.

Credit, 3.

Mr. CALDWELL, Mr. KINGDON, Mr. SOLT.

51. (I) ANCIENT HISTORY.—A general survey of Mesopotamian, Egyptian, Greek, and Roman history, with primary emphasis on cultural and intellectual achievements.

3 class hours.

Credit, 3.

Mr. DAVIS.

53. (I) INTERNATIONAL RELATIONS.—The nation-state system and conceptions of national interest in modern world politics. The forms and distribution of power by which states seek to implement national interests. The making of foreign policy and methods of adjusting international conflict. Attention will be given to current international problems.

3 class hours.

Credit, 3.

Mr. PFLANZE.

54. (II) THE FAR EAST (1954-55).—A general historical introduction to the civilization and contemporary problems of China and Japan. The first half covers the traditional civilization of China and Japan and the early impact of the west to 1890. The second half deals with revolutionary developments of the twentieth century and the place of the Far East in the world balance of power.

3 class hours.

Credit, 3.

Mr. GAGNON.

56. (II) HISTORY OF RUSSIA (1953-54).—A general historical introduction to the civilization and contemporary problems of Russia. Growth of the Russian state, society, culture and ideology, and their relations to the non-Russian world. Emphasis on the Soviet period.

3 class hours.

Credit, 3.

Mr. GAGNON.

57. (I) 58. (II) **HISPANIC-AMERICAN HISTORY.**—The first semester deals with the colonial period: the age of the "conquistadores", political, economic, and cultural developments, and growth of the independence movement; the second semester with the period of national development from 1810 to the present. Emphasis will be given to the history of Mexico and the more important South American countries. Either semester may be elected independently.

3 class hours.

Credit, 3.
Mr. POTASH.

59. (I) 60. (II) **HISTORY OF THE UNITED STATES.**—A survey of the national development including political, social, economic, and cultural factors in the growth of American democracy. The first semester covers the period to 1865; the second, from 1865 to the present. Either semester may be elected independently.

3 class hours.

Credit, 3.
Mr. CARY.

65. (I) **NINETEENTH AND TWENTIETH CENTURY ENGLAND (1953-54).**—A topical study of England since 1815. Emphasis is given to social change and to movements of thought. Subjects treated include: Victorian society and ideals; growth of democracy; imperial development; socialist Britain. Considerable biographical reading. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 32.

67. (I) **TUDOR AND STUART ENGLAND (1954-55).**—A brief survey of the Tudor Period followed by a detailed study of Early Stuart England. Emphasis is placed on social, religious, and intellectual aspects of English life in the period. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 31 or 32.

69. (I) **EUROPE, 1870-1918.**—Internal developments of the principal countries, including political and economic changes, social unrest, and intellectual currents; the development of imperialism; a detailed study of conditions and diplomacy which led to the World War; military history of the War.

3 class hours.

Credit, 3.
Mr. ZEENDER.

Prerequisite, History 6.

70. (II) **EUROPE SINCE 1918.**—Approximately half of the course is devoted to international affairs, including the

Peace Settlement, the development of German, Italian, and Japanese aggression, and World War II. The other half of the course is a study of internal developments in the principal European nations.

3 class hours.

Credit, 3.

Mr. CALDWELL.

72. (II) HISTORY OF AMERICAN WESTWARD EXPANSION, 1763-1893.—Advance of settlement from the Appalachians to the Pacific and influence of the frontier upon social, economic, and political conditions in the country as a whole.

3 class hours.

Credit, 3.

Mr. DAVIS.

Prerequisite, History 59.

75. (I) MEDIEVAL HISTORY.—Europe from the collapse of Roman civilization to the Renaissance. Fusion of the Graeco-Roman inheritance, Christianity, and Germanic traditions in the building of Western European civilization. The medieval outlooks as expressed in the thought and culture of the High Middle Ages.

3 class hours.

Credit, 3.

Mr. ZEENDER.

76. (II) HISTORY OF THE RENAISSANCE.—The later Middle Ages; the Church at the height of power; the rise of nationalities; the Italian towns; the New Learning and its relation to art, science, invention, geographical discoveries; spread and effects of the Renaissance.

3 class hours.

Credit, 3.

Mr. ZEENDER.

77. (I) 78. (II) THE HISTORY OF SCIENCE IN WESTERN CIVILIZATION.—This course will trace the growth of the community of science as it exists in the world today. Emphasis will be placed upon the mutual relations between science and the economic, social, and intellectual forces in society at large. Not offered in 1952-53.

2 class hours.

Credit, 2.

Mr. ———.

81. (I) DIPLOMATIC HISTORY OF THE UNITED STATES. 1776-1900.—Basic problems in American foreign policy to the end of the nineteenth century.

3 class hours.

Credit, 3.

Mr. CARY.

82. (II) DIPLOMATIC HISTORY OF THE UNITED STATES SINCE 1900.—The history of the United States as a world power.

3 class hours.

Credit, 3.

Mr. CARY.

Prerequisites, History 59 and 60 or permission of instructor.

91. (I) HISTORICAL BIBLIOGRAPHY.—Training in assembling a bibliography and an introduction to the works of some leading historians.

1 class hour.

Credit, 1.
Mr. CARY.

92. (II) SEMINAR.—Instruction in the evaluation of source materials and the preparation of reports.

1 class hour.

Credit, 1.
Mr. CARY.

HOME ECONOMICS

Professor MITCHELL, Associate Professor BRIGGS, Assistant

Professor MERRIAM, Assistant Professor COOK, Assistant

Professor PIATT, Assistant Professor STECH, Assistant

Professor DAVIS, Mrs. THIES, Mrs. WILHELM,

Miss DAVEY, Miss HAWES.

1. (I) INTRODUCTION TO HOME ECONOMICS.—The course introduces the student to the objectives in Home Economics and the fields of specialization for which it prepares. Consideration is given to a philosophy of living which emphasizes the responsibility of a woman to her family, to her community wherever she is, and to the world. Introductory work is offered in food and nutrition, child development and family life. Laboratory work includes food selection and simple preparation, and observation in the Nursery School.

3 class hours.

Credit, 3.

THE DEPARTMENT.

2. (II) CLOTHING SELECTION.—A study of the principles of clothing selection in order to assist each student to choose satisfactorily line, color, and texture; a study of the principles of buymanship in relation to ladies' ready-to-wear; fundamentals of construction for cotton and linen.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mrs. WILHELM.

26. (II) TEXTILES.—A study of fiber, yarn, finish, color and design. Acquaintance with a wide variety of fabrics is afforded to develop judgment in buying and using materials for clothing and home furnishing.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Miss BRIGGS.

30. (II) FOOD SCIENCE AND PREPARATION.—A study of the fundamental scientific principles and comparative methods of food preparation. The nutritional and economic aspects of foods are also stressed.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Miss DAVIS, Miss DAVEY.

31. (I) **APPLIED ART.**—Art principles are studied with many practical applications for selecting and arranging. Specific problems in decorating cloth, wood, and leather afford opportunity for individual expression.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Miss BRIGGS.

35. (I) **CLOTHING CONSTRUCTION.**—Advanced construction and fitting problems with emphasis on new fabrics.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mrs. WILHELM, Miss HAWES.

Prerequisite, Home Economics 2 or equivalent.

51. (I) **FOOD SELECTION AND MEAL PLANNING.**—Meal planning, serving and etiquette and emphasis on well-balanced meals as to nutritive value and economy of money, time, and labor in preparation. Further study of food principles and techniques of cookery and a unit in food preservation, freezing and canning is included.

2 class hours; 1 4-hour laboratory period.

Credit, 3.
Miss DAVIS, Miss DAVEY.

Prerequisite, Home Economics 30; Chemistry 33.

52. (II) **NUTRITION AND DIETETICS.**—A study of the fundamentals of normal nutrition including energy needs, the metabolism of proteins, carbohydrates, fats, vitamins, and minerals; and the quantitative requirements for these various essential nutrients. Laboratory work provides for further study of the composition of foods and their contribution to the diet and the relationship of the nutritive value to cost. Nutritive loss due to cooking, storage, etc. is given consideration.

3 class hours; 1 2-hour laboratory period.

Credit, 3.
Mrs. COOK.

Prerequisites, Home Economics 30; Chemistry 33 and Zoology 1 or 35.

54. (II) **NUTRITION.**—For students who are not majoring in Home Economics and who do not have prerequisites for Home Economics 52. This course is designed to interpret the technical knowledge of foods and nutrition in terms of its practical application for optimum health.

2 class hours.

Credit, 2.
Mrs. COOK.

56. (II) **FOOD PREPARATION AND MEAL PLANNING.**—For students not majoring in home economics. This course is designed to meet the needs of those who wish a general knowledge of the basic food principles. It includes latest methods and techniques of cookery, conservation of nutrients, menu planning and food preparation, buying of food, consumer education and table service, decoration and etiquette. It is

recommended for students who want a scientific as well as practical knowledge of food and its preparation for everyday use.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Miss DAVEY.

57. (I) CLOTHING SELECTION AND SIMPLE CONSTRUCTION.

—For students not majoring in home economics. This course is designed to stimulate an interest in good workmanship. Emphasis is given to construction technique such as fitting, pattern use and altering.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Miss HAWES.

60. (II) HOUSEHOLD EQUIPMENT AND DEMONSTRATION TECHNIQUES. — Selection, care and operation of household equipment and the study of the mechanical principles involved. Student demonstrations given for practice with all types of equipment. Study of home lighting and wiring. Outside demonstrations and field trips are planned.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Miss MERRIAM.

62. (II) HOME FURNISHING.—A study of the fundamental principles which underlie the successful planning and furnishing of a satisfying home. A study of period homes and furnishings is included. Many applications of these principles are worked out in practical problems.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Miss BRIGGS.

70. (II) CHILD DEVELOPMENT.—The growth and development of the child, his basic needs, aspects and behavior—routine, creative and social—as they are related to personality development. Planned observation and participation in nursery work.

3 class hours; 1 1-hour laboratory period.

Credit, 3.

Mrs. THIES.

71. (I) RETAIL FOOD BUYING.—This course is offered jointly by the departments of olericulture, animal husbandry, and poultry husbandry for all students interested in retail marketing. First 5 weeks: vegetables and fruits, retail buying, varieties and adaptability to various uses, season of availability, grades, packs and packages. Second 5 weeks: poultry and eggs—dressed poultry is graded and prepared in various ways for the table and home freezing. Demonstrations are given of handling and market classification of eggs. Third 5 weeks: meats—demonstration and laboratory practices in

identification and classification of meat cuts, in preservation (freezing and curing) and in judging quality.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 3:00-4:50 Tu.

Mr. SNYDER, Mr. VONDELL, Mr. HALE.
Miss DAVIS, coordinator.

75. (I) ECONOMICS OF THE HOUSEHOLD.—A study of personal and family standards of living in the modern home, the economic relations of the household, and the use of time, energy, and money as a means to influence the home situation.
3 class hours. Credit, 3.

Miss MERRIAM.

77. (I) and (II) HOME MANAGEMENT PRACTICE.—Successive groups of seniors live in the home management house or apartment and assume responsibilities involved in managing a home. Meals are planned on low, medium, and high income levels.

Credit, 3.

Miss MERRIAM, Miss DAVEY.

Prerequisites, Home Economics 51, 52, and 75, or by special permission .

80. (II) FAMILY LIFE.—A study of the modern family; ideals and responsibilities of the home and the individual's share in developing positive family relationships.

3 class hours. Credit, 3.
Mrs. PIATT.

81. (I) METHODS OF TEACHING HOME ECONOMICS.—A study of the philosophy of general education; the application of home economics to the entire school program; development of curricula based upon student needs; exploration of instructional methods and techniques. This course gives credit toward meeting state standards for teachers.

3 class hours. Credit, 3.
Mrs. PIATT.

85. (I) THEORY AND PRACTICE OF NURSERY SCHOOL MANAGEMENT.—This course is planned to give students a background in the history and philosophy of the pre-school program; theory and techniques of nursery school practice; children's activities in music, art, literature, and science; fundamentals of play and use of play materials, and methods of observation and recording. Supervised participation in child development laboratory as well as field trips to observe special groups.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mrs. THIES.

Prerequisite, Home Economics 70.

87. (I) PRINCIPLES AND PRACTICES OF TAILORING.—Emphasis on handling of wool in the making of suits and coats.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mrs. WILHELM.

Prerequisite, Home Economics 35 or equivalent.

88. (II) APPLIED DRESS DESIGN.—Costume design through draping and pattern making. An intensive study is made of texture, line, color and fit as applied to dress design and the figure.

3 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM.

Prerequisite, Home Economics 35 or equivalent.

89. (I) DIET THERAPY. — The application of nutrition principles to diet in disease. Recent theories of dietary treatment of gastro-intestinal disorders, obesity, anemia, fevers, diabetes, food allergy, cardiovascular and biliary tract diseases are reviewed critically. Students are required to use and be familiar with current medical literature as it applies to nutritional problems in disease and at the same time be open-minded regarding new developments in this field. Scientific and medical terminology is emphasized.

3 class hours.

Credit, 3.

Mrs. Cook.

Prerequisites, Home Economics 52; Chemistry 79; Zoology 35.

90. (II) NUTRITION SEMINAR. — For qualified seniors. Reading and oral reports of scientific literature and preparation of bibliographies.

1 class hour.

Credit, 1.

Mrs. Cook.

91. (I) 92. (II) QUANTITY FOOD PREPARATION AND INSTITUTIONAL MANAGEMENT.—For qualified juniors or seniors interested in institutional food service. A study of the principles of organization, personnel management, the administration, food costs, operating expenses, and the special functions of the dietitian. Laboratory work is at one of the university dining halls and field trips are planned. It is expected that students will enroll for the work of both semesters. Students wishing to qualify for administrative institutional work are advised to take Accounting 25 and Home Economics 71.

1 class hour; 1 5-hour laboratory period first sem. Credit, 3.

2 class hours, 1 3-hour laboratory period 2nd sem.

Miss STECH.

Prerequisites, Home Economics 51 and 52.

93. (I) EXPERIMENTAL FOODS.—The testing and comparing of different food materials and methods of preparation,

including advanced work in the science and techniques of cookery. Special individual problems will be studied. The course is helpful to those interested in commercial food testing and valuable to those wishing to develop a scientific approach to the study of foods.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Miss DAVIS.

Prerequisite, Home Economics 30.

95. (I) CHILD NUTRITION.—A study is made of nutritional needs from prenatal life through infancy and childhood. Methods of judging nutrition, also causes and effects of malnutrition are discussed. Menus for children and measures to insure the consumption of optimal diets are put in practice with laboratory work in the Nursery School.

3 class hours. Laboratory by arrangement.

Credit, 3.
Mrs. COOK.

Prerequisite, Home Economics 52 or 54.

98. (I) and (II) PROBLEMS IN HOME ECONOMICS.—An intensive study of some phase of home economics. By permission of the Staff adviser.

Credit, 3.
HOME ECONOMICS STAFF.

HYGIENE

HYGIENE.—All freshmen are required to attend a series of lectures on personal hygiene. For men students these lectures are included in the Military program; for women students they are scheduled as a separate course.

Credit, 1.
THE HEALTH SERVICE STAFF.

JOURNALISM

Professor MUSGRAVE.

84. (II) COMMUNITY JOURNALISM.—A study of the weekly newspaper, the small-city daily, and the scholastic press, combined with training in copyediting. The University and town weeklies are used as laboratories Given in 1953 and alternate years.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

85. (I) INTRODUCTION TO JOURNALISM.—A basic course in reporting designed to acquaint the student with the scope, principles, and practice of contemporary journalism. Stress is placed upon the role of the press as a social institution and upon the relationships between a general education and effective journalism.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

86. (II) **FEATURE ARTICLE WRITING.**—Instruction in writing feature or magazine articles, combined with a study of the field of magazine journalism. The practice work is related to problems of interpretative writing, communication, and public opinion. Each student is expected to publish a feature article in a newspaper, a trade journal or other magazines.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

8. (II) **NEWSPAPER INTERNSHIP.**—Advanced reporting and copyediting, with laboratory work on daily newspapers in the area. Limited to seniors who intend to go into newspaper or public relations or radio news or editing work. Admission only by permission of instructor.

2 class hours; 1 laboratory period.

Credit, 3.
Mr. MUSGRAVE.

Prerequisites, Journalism 85, and 84 or 86.

LANDSCAPE ARCHITECTURE

Professor OTTO, Professor BLUNDELL, Assistant Professor
McLINDON, Assistant Professor PROCOPIO, Mr. MACIVER,
Mr. HAMILTON.

Landscape Architecture

25. (I) **FREEHAND DRAWING AND ELEMENTARY DESIGN.**—The work in this course is to supply the student with technical aspects of freehand drawing and design necessary to proficiency in that field.

3 2-hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. MACIVER.

26. (II) **LANDSCAPE DRAFTING.**—This course continues the work in Landscape Architecture 25, but draws on the mechanical aspects of the designers problems and includes simple projections—orthographic, perspective, and isometric—and architectural shades and shadows.

3 2-hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. MACIVER.

51. (I) **ELEMENTS OF TOPOGRAPHY AND CONSTRUCTION.**—Contour interpolation, grading and drainage plans, drive design, profiles and sections, computation of earth work. Application of surveying to landscape construction.

3 2-hour laboratory periods.
3:00-4:50 M. W. F.

Credit, 3.
Mr. PROCOPIO.

Prerequisites, Civil Engineering 27; Landscape Architecture 26.

52. (II) CONSTRUCTION DETAILS.—A series of problems in architectural garden features as walks, steps, walls, gates, pools, and small structures.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. PROCOPIO.

Prerequisites, Landscape Architecture 51.

53. (I) GARDEN DESIGN. — Fundamental principles of composition with application to problems in the design of gardens and small home grounds.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. OTTO.

Prerequisites, Landscape Architecture 25 and 26 or permission of the instructor.

54. (II) GENERAL DESIGN.—A series of problems in the design of small properties, estates and parks. Members of this class will be required to take a two-day field trip to visit typical examples of design; approximate cost, \$10.00.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. OTTO.

Prerequisites, Landscape Architecture 51, 53, and concurrently 52.

79. (I) CONSTRUCTION AND MAINTENANCE (1953-54).—A study of construction methods and the maintenance of estate, park, and recreation areas. Given in alternate years.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. PROCOPIO.

80. (II) HISTORY AND LITERATURE OF LANDSCAPE ARCHITECTURE.—A review of the significant history and literature of landscape architecture and the allied fields of city planning, regional planning and highway improvement. Compilation of bibliographies on various phases of these fields.

2 class hours.

Credit, 2.

8:00-8:50 Tu. Th.

Mr. McLINDON.

81. (I) 82. (II) ADVANCED DESIGN.—Class B Exchange Problems plus specialized study of landscape details and a summary of general design. Members of the class may be required to take a two-day field trip to visit typical examples of design; approximate cost, \$15.00.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. HAMILTON.

Prerequisites, Landscape Architecture 53 and 54.

83. (I) ARCHITECTURE (1954-55).—The history of architectural development, including styles of architecture and construction principles of value to landscape architects when

working with architectural problems. Given in alternate years.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

Mr. McLINDON.

84. (II) SKETCHING.—Drawing and sketching in various mediums from outdoor and indoor subjects.

2 2-hour laboratory periods.

Credit, 2.

Mr. MACIVER.

86. (II) CITY PLANNING.—A critical examination of those factors which influence and guide the physical growth and arrangement of communities in harmony with their social and economic needs.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.

Mr. McLINDON.

87. (I) CITY PLANNING.—An application of the principles of modern civic art through a series of problems on the design of various types of urban land areas.

3 2-hour laboratory periods.

Credit, 3.

Mr. McLINDON.

Prerequisite, Landscape Architecture 86.

Horticulture

1. (I) PLANT PROPAGATION.—This course serves as an introduction to the field of horticulture, emphasizing the methods and principles involved in the propagation of horticultural plants.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. THAYER, Mr. PROCOPIO.

26. (II) PLANT MATERIALS.—Detailed study of deciduous and evergreen trees, with special reference to their mature form and character, means of identification, natural associations, and uses of the various types of trees in landscape work.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

51. (I) PLANT MATERIALS.—Detailed study of shrubs and woody vines, and their identification, with especial emphasis being given to their adaptability to the various landscape uses, methods of handling, and care.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

52. (II) PLANTING DESIGN.—A study of the utilization of plant materials in combination as applied to the many conditions and demands of landscape work.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

Prerequisites, Horticulture 26 and 51.

Latin

51. (I) 52. (II) **LATIN.**—A course in elementary Latin. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours.

Credit, 3.
Miss TILLONA.

55. (I) 56. (II) **LATIN.**—A college survey of classical Latin literature: epic (Virgil), lyric (Catullus and Horace), comedy (Plautus), oratory (Cicero), and philosophy (Lucretius). The list may be varied according to the needs of particular classes.

3 class hours.

Credit, 3.
Mr. GREENFIELD.

Prerequisites, Latin 51, 52 or 2 years of high school Latin.

MATHEMATICS

Professor ANDERSON, Professor MACHMER, Professor WAGNER, Associate Professor BOUTELLE, Assistant Professor SCHOONMAKER, Assistant Professor ROSE,† Assistant Professor CULLEN, Assistant Professor LITOFF, Mr. BUZZELL, Mr. SKILLINGS, Mr. ALLEN, Mr. MIENKA,† Mr. MOSER, Mr. HALPERN,† Mr. KHEIRALLA, Mr. BUSSEL, Mr. DAVIS, Mr. PUNGA, Mr. WATSON.

01. (I) **ELEMENTARY COLLEGE ALGEBRA.**—A course intended for those students who offer only one unit of algebra for entrance. It contains a review of elementary algebra and a more thorough study of such topics as quadratic equations, exponents and radicals, and progressions. No college credit is given for this course, but the successful completion of this course and Mathematics 14 which follows in the second semester, may satisfy the freshman mathematics requirement unless the student's major requires further mathematics.

3 class hours.

Credit, 0.
THE DEPARTMENT.

5. (I) **INTRODUCTORY ENGINEERING MATHEMATICS.**—Trigonometry and algebra: a rapid basic review, theory of equations, simple determinants and the slide rule. Plane analytic geometry: the straight line, conic sections, selected higher plane curves, polar coordinates and parametric equations.

4 class hours.

Credit, 4.
THE DEPARTMENT.

6. (II) **INTRODUCTORY CALCULUS FOR ENGINEERS.**—Differentiation, with applications, technique of integration.

4 class hours.

Credit, 4.
THE DEPARTMENT.

Prerequisite, Mathematics 5.

† On leave of absence.

7. (I) ALGEBRA AND TRIGONOMETRY.—For all freshmen, except majors in Engineering, who are required to take a full year of college mathematics. Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry.

3 class hours.

Credit, 3.

THE DEPARTMENT.

8. (II) ALGEBRA.—This course is designed for the freshmen who do not plan to proceed to Calculus. Theory of equations, progressions, mensuration, number systems, and the elements of statistics and mathematics of investments.

3 class hours.

Credit, 3.

THE DEPARTMENT.

10. (II) ALGEBRA AND ANALYTIC GEOMETRY. — This course is designed for the freshmen who plan to take Calculus. Theory of equations, binominal theorem, determinants of higher order, and plane analytic geometry.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 7.

12. (II) FUNCTIONAL MATHEMATICS.—For freshmen who are not required to take a full year of college mathematics. Fractions, percentage, linear and quadratic equations with applications, exponents, logarithms, slide rule, proportion, graphs, statistics, progressions, and the elements of mathematics of investments.

3 class hours.

Credit, 3.

THE DEPARTMENT.

14. (II) TRIGONOMETRY AND ANALYTIC GEOMETRY.—A study of the essential elements of elementary trigonometry and of the elementary analytic geometry of the straight line and the conic sections.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 01.

29. (I) DIFFERENTIAL CALCULUS.—The basic ideas and methods of the differential calculus.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 10.

30. (II) INTEGRAL CALCULUS.—A continuation of Mathematics 29 into the field of the integral calculus, with special emphasis on application to problems.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 29.

31. (I) APPLIED CALCULUS FOR ENGINEERS.—Area, volume, length of curve, centroid, moment of inertia, liquid pressure, work, partial differentiation.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 6.

32. (II) APPLIED CALCULUS FOR ENGINEERS.—Multiple integrals, infinite series, expansion of functions, hyperbolic functions, differential equations.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 31

51. (I) MODERN SYNTHETIC GEOMETRY.—An extension of the geometry of the triangle and the circle. The course is intended especially for those planning to be high school teachers.

3 class hours.

Credit, 3.

Mr. ROSE.

Prerequisite, Mathematics 30.

53. (I) 54. (II) HIGHER ALGEBRA.—Permutations, combinations, probability; mathematical induction, matrices, determinants, linear equations and dependence; quadratic forms and elimination theory; the complex number system; polynomial equations; elementary theory of groups, rings and fields.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 10.

55. (I) MATHEMATICS OF FINANCE.—The mathematical principles of simple and compound interest, annuities, depreciation, valuation of bonds, insurance. The development and application of aids to computation in problems arising from financial transactions.

3 class hours.

Credit, 3.

Mr. BOUTELLE.

Prerequisite, Mathematics 7.

56. (II) FINITE DIFFERENCES AND PROBABILITY (1952-53).—Given in alternate years.

3 class hours.

Credit, 3.

Mr. WAGNER.

Prerequisite, Mathematics 30.

60. (II) SPHERICAL TRIGONOMETRY AND SOLID ANALYTIC GEOMETRY (1953-54).—The trigonometry of the sphere with application to terrestrial and celestial problems. This is followed by a study of higher plane curves and the analytic

representation of points, lines, and surfaces in space. Given in alternate years.

3 class hours.

Credit, 3.
Mr. BOUTELLE.

Prerequisite, Mathematics 30.

62. (II) STATISTICS. — The fundamental mathematical principles of statistical analysis. The derivation of the basic formulas used, and the study and discussion of such topics as averages, dispersion, skewness, curve fitting, least squares, linear and curvilinear correlation, probability and its application to statistics.

3 class hours.

Credit, 3.
Mr. WAGNER.

Prerequisite, Mathematics 30, previously or concurrently.

66. (II) INTRODUCTION TO HIGHER GEOMETRY (1953-54). —A study of various methods employed in the modern treatment of the geometry of points, lines, and conics. Such topics as homogeneous point and line coordinates; infinite elements; harmonic division; groups of transformations and their invariants; and the elements of projective and other geometries, will be considered. Given in alternate years.

3 class hours.

Credit, 3.
Mr. ANDERSEN.

Prerequisite, Mathematics 10.

71. (I) VECTOR ANALYSIS (1954-55).—The algebra and calculus of vectors. Applications to physics and other fields will be considered. Given in alternate years.

3 class hours.

Credit, 3.
Mr. ANDERSON.

Prerequisites, Mathematics 30; Physics 26.

72. (II) HISTORY OF MATHEMATICS (1952-53).—A study of mathematics as it has developed historically. Topics considered include classical problems and concepts of mathematics and the lives and times of the great mathematicians. This course is recommended especially for prospective high school teachers. Given in alternate years.

3 class hours.

Credit, 3.
Mr. ROSE.

Prerequisite, Mathematics 30.

74. (II) THEORY OF NUMBERS (1953-54).—Euclid's Algorithm, Theory of Prime Numbers, Aliquot parts, congruences, further topics in number theory. Given in alternate years.

3 class hours.

Credit, 3.
THE DEPARTMENT.

Prerequisite, Mathematics 30.

81. (I) DIFFERENTIAL GEOMETRY (1953-54).—Theory of the geometry of curves and surfaces in three dimensions. Given in alternate years.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

83. (I) COMPUTATIONAL METHODS (1952-53).—Errors and approximations in computation, methods of approximating roots of equations, approximation of functions, empirical curve fitting, approximate integration, and numerical integration of ordinary differential equations. Given in alternate years.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

91. (I) (INTERMEDIATE) CALCULUS.—Series, expansion of functions, partial differentiation, envelopes, and multiple integrals.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

92. (II) DIFFERENTIAL EQUATIONS.—

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

93. (I) ADVANCED CALCULUS.—The real number system, sequences, elementary theory of functions of one variable and of several variables, Riemannian integration, line integrals, Green's theorem.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 91.

94. (II) ADVANCED CALCULUS.—Double and triple integrals, improper integrals, gamma functions, Beta functions, elliptic functions, calculus of variations, Fourier Lines, Laplace Transforms.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 93.

Astronomy and Meteorology

57. (I) METEOROLOGY.—A consideration of weather elements, air masses, frontal structures and storms, the construction and interpretation of weather maps and the general principles of weather forecasting.

2 class hours.

Credit, 2.

8:00-8:50 Tu. Th.

Mr. LANPHEAR.

58. (II) ASTRONOMY.—The course deals with a consideration of the atmosphere through which astronomical phenomena are observed; fundamental conceptions of the celestial sphere, the solar system, stars, galaxies. The chief objective is to make the student alive to the beauty and order revealed in the sky.

2 class hours.

8:00-8:50 Tu. Th.

Credit, 2.

Mr. LANPHEAR.

MILITARY SCIENCE AND TACTICS

Colonel SHAW, PMST, Major WILLOUGHBY, Assistant PMST,
Captain COOKINGHAM, Assistant PMST,
Captain PETERS, Assistant PMST.

1. (I) 2. (II).—Theoretical and practical instruction in leadership, drill and exercise of command; military organization; maps and aerial photographs; first aid and hygiene; and military policy of the United States, the National Defense Act, and ROTC.

3 scheduled hours.

First semester, Credit, 3.

Second semester, Credit, 2.

ARMY INSTRUCTORS.

25. (I) 26. (II).—Theoretical and practical instruction in leadership, drill and exercise of command; the tactics and techniques of the armored cavalry to include basic communications and basic motors; history and mission of armored cavalry; mechanical training with tank weapons; scouting and patrolling; and individual and crew served weapons. Emphasis is placed on the functions, duties, and responsibilities of junior noncommissioned officers in the capacity of squad borders, assistant squad leaders, guides, and guidon bearers.

3 scheduled hours.

Credit, 2.

ARMY INSTRUCTORS.

51. (I) 52. (II).—Theoretical and practical instruction in leadership, drill and exercise of command; the tactics and techniques of the armored cavalry to include communications, tank gunnery, motors, tank driving; troop leading; and organization of armored units. Emphasis is placed on the functions, duties, and responsibilities of senior non-commissioned officers.

5 scheduled hours.

Credit, 3.

ARMY INSTRUCTORS.

75. (I) 76. (II).—Theoretical and practical instruction in leadership, drill and exercise of command; military law and military boards; military administration; military teaching methods; and the tactics and techniques of the armored cavalry to include combat intelligence, communications, tank

gunnery, motors, tank driving; supply and evacuation; and new military developments. Emphasis is placed on the functions, duties, and responsibilities of junior commissioned officers.

5 scheduled hours.

Credit, 3.

ARMY INSTRUCTORS.

AIR SCIENCE AND TACTICS

Lieutenant Colonel DEHORN, PAST, Lieutenant Colonel PRATT, Assistant PAST, Major BARRETT, Assistant PAST, Major GRAPENTINE, Assistant PAST, Major SEARLE, Assistant PAST, Major WELLS, Assistant PAST, Major ZDROJKOWSKI, Assistant PAST, Captain GAUMOND, Assistant PAST, Captain McCOLLOR, Assistant PAST, Captain NATALE, Assistant PAST, 1st Lieutenant COLE, Assistant PAST, 1st Lieutenant HAMLIN, Assistant PAST.

1. (I) 2. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, history and development of aviation, fundamentals of global geography, international tensions and security organizations, and instruments of national military security.

3 scheduled hours.

First semester, Credit, 3.

Second semester, Credit, 2.

AIR FORCE INSTRUCTORS.

25. (I) 26. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, careers in the United States Air Force, and elements of aerial warfare, consisting of a study of targets, weapons, aircraft, the air ocean, bases, and forces.

3 scheduled hours.

Credit, 2.

AIR FORCE INSTRUCTORS.

51. (I) 52. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, the air force commander and his staff, problem solving techniques, the communication process and air force correspondence, military law, courts and boards, air force base functions, and applied air science, consisting of a study of aircraft engineering, navigation, and weather.

5 scheduled hours.

Credit, 3.

AIR FORCE INSTRUCTORS.

75. (I) 76. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, military administration, Air Force inspection systems, military teaching methods, military law and boards, military management, logistics, and career development. Engineering and Science majors pursue a course in Armament which consists of a study of radar, fire control systems, gyro principles, theory

of bombing, bomb sights and radar bombing equipment. Business Administration majors pursue a course in Administration and Logistics which consists of a study of the Air Comptroller, Food Service Supervisor and the administration of personnel of the Wing Base Staff. All other majors may pursue a course in Flying Operations which includes a study in advanced navigation and bombing to include theory of radar, and duties and responsibilities of Electrical Counter Measure Officer, Radar Observer, and All Weather Fighter. 5 scheduled hours. Credit, 3.

AIR FORCE INSTRUCTORS.

OLERICULTURE

Professor SNYDER, Assistant Professor TUTTLE,
Mr. JOHNSON,† Mr. CAMPBELL.

25. (I) GENERAL OLERICULTURE.—A study of the factors affecting the growth of plants which are essential to a basic understanding of the cultural requirements of vegetable and other horticultural crops.

2 class hours; 1 2-hour laboratory period

Credit, 3.

Mr. JOHNSON.

51. (I) PLANT NUTRITION.—A critical study of the water and nutrient requirement of vegetable plants as applied to irrigation, soils and their preparation, manures, fertilizers, lime, green manures and crop residues.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. TUTTLE.

52. (II) PLANT CULTURE.—A study of certain environmental factors which influence the culture of vegetables as applied to actual commercial practices.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. JOHNSON.

73. (I) VEGETABLE MARKETING PRACTICES.—A consideration of the various factors, techniques, and methods in harvesting and preparing vegetables for market, including marketing centers, production areas, market and consumer preference, packing house facilities equipment, and pre-market storage. Trips to nearby growers and markets will be required at a cost of not over ten dollars.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

Prerequisite, Agricultural Economics 55.

74. (II) MERCHANDISING OF PERISHABLES.—Discussion and demonstrations in this course will include the various techniques, practices, and methods that are used in selling and distributing horticultural commodities through both wholesale and retail outlets from the farm to the ultimate

† On leave of absence.

consumer. Trips to the Boston and New York markets may be elected by the student at a reasonable cost.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

75. (I) **SYSTEMATIC OLERICULTURE**.—A detailed study of variety identification; nomenclature and classification; history, variety improvement and seed sources; judging and exhibiting.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Hours by arrangement.

Mr. SNYDER.

76. (II) **GREENHOUSE CROPS AND PLANT GROWING (1952-53)**.—A study of the culture of greenhouse crops including cucumbers, tomatoes, lettuce, rhubarb, and mushrooms; the growing of seeding plants both under glass and in the open for local retail or wholesale business.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. JOHNSON.

78. (II) **COMMERCIAL OLERICULTURE**.—A study of the problems in the commercial production of vegetables; general culture, fertilizers and manures, machinery, labor, harvesting, and marketing. One or two trips to important markets and truck growing sections are required. Twenty-five dollars will cover the cost of these trips.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. TUTTLE.

81. (I) 82. (II) **SEMINAR**.—Advanced study of problems relating to vegetable production.

1 class hour.

Credit, 1.

Hours by arrangement.

THE DEPARTMENT.

PHILOSOPHY

Professor GLICK. Assistant Professor SHUTE.

61. (I) **INTRODUCTION TO PHILOSOPHY**.—A general approach to philosophy both from the standpoint of method and content; an attempt to understand and evaluate contemporary ideas.

3 class hours.

Credit, 3.

Mr. GLICK.

62. (II) **HISTORY OF PHILOSOPHY**.—A survey of the development of western thought from the early Greeks to the present.

3 class hours.

Credit, 3.

Mr. GLICK.

63. (I) **LOGIC**.—A study of the principles, problems and methods of critical thinking; emphasis upon principles and methods of formal logic; critical study of inductive reasoning and scientific method with applications to current problems.

3 class hours.

Credit, 3.

Mr. GLICK.

64. (II) ETHICS.—The meaning of good and evil, right and wrong; survey of ethical theories and practices both historical and contemporary; an attempt to evaluate these theories with reference to modern ethical problems.

3 class hours.

Credit, 3.
Mr. GLICK.

81. (I) PHILOSOPHY OF RELIGION.—A survey of the contrasting types of religious philosophy in the contemporary western world and Asia, with a critical and constructive study of basic issues, such as the meaning of knowledge in the field of religion, the nature of faith, and the religious interpretation of reality.

3 class hours.

Credit, 3.
Mr. SHUTE.

82. (II) AESTHETICS.—A study of the leading modern theories of the nature of art, the analysis of aesthetic experience, the distinctive function of art in culture and personality, and the principles of criticism.

3 class hours.

Credit, 3.
Mr. SHUTE.

83. (I) READINGS IN ANCIENT PHILOSOPHY.—Selections are read from Plato's dialogues and from the works of Aristotle. A study is made of the leading philosophical issues discussed by these writers, with emphasis on ideas which became basic in the development of western thought.

3 class hours.

Credit, 3.
Mr. SHUTE.

84. (II) READINGS IN MODERN PHILOSOPHY.—Selections are read from Locke, Hume, Kant, and Whitehead, to display the leading ways in which modern thinkers have looked upon the nature of the universe and the possibilities and limitations of knowledge.

3 class hours.

Credit, 3.
Mr. SHUTE.

85. (I) METAPHYSICS.—The field of metaphysics defined in distinction from the field of science, contrasting theories of reality offered by contemporary naturalism and idealism, especially in the light of recent developments in biological and physical science; analysis of basic ideas which will enable the student to continue a fruitful development of his own philosophy.

3 class hours.

Credit, 3.
Mr. SHUTE.

86. (II) THEORY OF KNOWLEDGE.—Types of knowledge and correlated methods of knowing; questions of certainty, probability, and limits of knowledge; ways of expression, such

as mathematical formulae, language, and art, and their involvement in the knowing process; the nature of the relation between the knowing subject and the known object.

3 class hours.

Credit, 3.
Mr. SHUTE.

PHYSICAL EDUCATION FOR MEN.

Professor MCGUIRK, Professor GORE, Professor LORDEN,
Professor O'ROURKE, Associate Professor KAUFFMAN,
Associate Professor DERBY, Associate Professor BRIGGS,
Associate Professor ROGERS, Associate Professor
GLADCHUK, Assistant Professor CURRAN,
Mr. BALL, Mr. SALWAK, Mr.
KOSAKOWSKI, Mr. RICCI.

Activity Courses

3. (I) 4. (II) PHYSICAL ACTIVITY COURSE.—The object of the course is to help every student, through regularity and continuity of physical activity, to realize not only his physical and mental capacities, but learn to use them as an intelligent, cooperative, and efficient citizen. The students are given motor ability tests, expected to learn to swim and to meet minimum standards in the basic skills through participation in team sports and exercise.

3 class hours.

Credit, 1.
THE DEPARTMENT.

33. (I) 34. (II) PHYSICAL EDUCATION.—A continuation of Physical Education 3 and 4.

3 class hours.

Credit, 1.
THE DEPARTMENT.

Skills and Techniques in Physical Education

The following courses are concerned with the methods and techniques of applied physical education and are primarily for students enrolled for degree or teaching credentials in physical education. Classroom presentation, field, court and floor demonstrations: Non-major admission only by permission of the instructor.

5. (I) 6. (II) SKILLS AND TECHNIQUES.—Teaching and organizing groups for participation in touchfootball, basketball, skiing, swimming, and softball.

3 class hours.

Credit, 1.
THE DEPARTMENT.

35. (I) SKILLS AND TECHNIQUES.—Teaching and organizing groups for participation in soccer, speedball, track and field.

3 class hours.

Credit, 1.
THE DEPARTMENT.

36. (II) **SKILLS AND TECHNIQUES.**—Instruction in techniques of teaching elementary apparatus, tumbling and pyramids with emphasis on construction of gymnastic routines and formulation of demonstrations.

3 class hours.

Credit, 1.

THE DEPARTMENT.

63. (I) 64. (II) **SKILLS AND TECHNIQUES.**—Teaching and organizing groups for participation in golf, badminton, boxing, archery.

3 class hours.

Credit, 1.

THE DEPARTMENT.

83. (I) 84. (II) **SKILLS AND TECHNIQUES.**—Teaching and organizing groups for participation in tennis, wrestling, rhythmic, volleyball, angling.

3 class hours.

Credit, 1.

THE DEPARTMENT.

21. (I) **HISTORY AND PURPOSES OF PHYSICAL EDUCATION.**—A brief study of the history of the development of the various systems of physical education and a study of the aims and ideals of present-day physical education.

3 class hours.

Credit, 3.

Mr. LORDEN.

43. (I) **OFFICIATING.**—Technique and practice in officiating football and soccer.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

Mr. BALL.

44. (II) **OFFICIATING.**—Technique and practice in officiating basketball and baseball.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

Mr. BALL.

51. (I) **HUMAN ANATOMY.**—A course in structural human anatomy.

3 class hours.

Credit, 3.

Mr. RICCI.

52. (II) **APPLIED ANATOMY AND KINESIOLOGY.**—A course aimed to give the anatomical application basal to a thorough understanding of the mechanical problems in apparatus, athletic, and corrective exercises.

3 class hours.

Credit, 3.

Mr. KAUFFMAN.

Prerequisite, Physical Education 51.

53. (I) **PHYSICAL EDUCATION—ELEMENTARY SCHOOL.**—This course includes the objectives, organization, significance, and content of physical education in the grade schools. The

course is correlated with the requirements of the State Department of Education.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. DERBY.

54. (II) PHYSICAL EDUCATION—SECONDARY SCHOOLS.—The course includes the objectives, organization, significance, and content of physical education in the secondary schools. The course is correlated with the requirements of the State Department of Education.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. DERBY.

55. (I) TESTS AND MEASUREMENTS.—This course considers the status of measurement in physical education, an historical sketch, typical of contributions in anthropometrics, strength tests, ability and achievement tests, cardiac functional tests, neuro-muscular control tests, and sports technique tests; and it includes the tools of measurement, indices, and the theory and practice of test administration.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. SALWAK.

58. (II) ORGANIZED CAMPING ADMINISTRATION.—This course includes the history of organized camping, minimum standards of health and safety, the development of camping philosophies, trends, and the camping industry.

3 class hours.

Credit, 3.
Mr. GORE.

59. (I) SCOUTING ELEMENTS AND PRINCIPLES.—A course in scouting education with emphasis on aims, methods and program content and their effect upon the character of youth and his training for citizenship.

1 class hour; 1 2-hour laboratory period.

Credit, 2.
Mr. GORE.

71. (I) 72. (II) SPECIAL PROBLEMS COURSE.—Presentation and discussion of research work in physical education, health and safety education, or athletics.

3 class hours.

Credit, 3.
Mr. GORE, Mr. SALWAK and the DEPARTMENT.

74. (II) RECREATION—RECREATION LAND USE.—Including types of recreational areas, recreational resources, recreational needs of the people, geography of recreation, competitors of recreational land use, economic aspects of federal, state, and local recreational systems.

3 class hours.

9:00-9:50 M. W. F.

Credit, 3.
Mr. GORE.

75. (I) ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION.—Problems and precedures in physical education,

organization of program, class schedules, classification of students, equipment, records, finance, intramurals, construction and maintenance of gymnasias, swimming pools, locker rooms, and outdoor play areas.

3 class hours.

Credit, 3.
Mr. MCGUIRK.

77. (I) COACHING.—This course outlines the coaching of football and soccer.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. O'ROURKE, Mr. BRIGGS.

78. (II) COACHING.—Continuation of Course 77. This course outlines the coaching of basketball, baseball, and track and field.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. BALL, Mr. LORDEN, Mr. DERBY.

79. (I) ADAPTIVE PHYSICAL EDUCATION.—A program of developmental activities, games, sports, and rhythms suited to the interests, capacities and limitations of students with disabilities who may not safely engage in unrestricted participation in the vigorous activities of the general physical education program.

3 class hours. Credit, 3.
Mr. KAUFFMAN, Mr. RICCI.

Safety Education Section

22. (II) FIRST AID INSTRUCTOR COURSE.—This course includes training in the standard, advanced and instructor First Aid Courses. Successful completion results in certification as American National Red Cross First Aid Instructor.

3 class hours. Credit, 3.
Mr. GORE.

42. (II) WATER SAFETY INSTRUCTOR COURSE.—This course includes training in senior lifesaving and the instructor Water Safety Course. Successful completion results in certification as American National Red Cross Water Safety Instructor. Some work is given in the conduct competitive swimming diving, canoeing, boating and recreational swimming programs

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. GORE, Mr. ROGERS.

85. (I) SAFETY EDUCATION INSTRUCTOR COURSE.—This course includes activities and procedures, in-school and out-of-school, designed to develop habits and attitudes that will lead to safe behavior thru experiences in desirable safety

practices. The course is designed primarily for seniors majoring in physical education and for elementary and secondary school teachers.

2 class hours.

Credit, 2.
Mr. GORE.

86. (II) DRIVER EDUCATION INSTRUCTOR COURSE.—This course includes driver education and driver training at the instructor's level, and is designed to orient the student to live safely thru skillful and efficient behavior on streets and highways. Leads to certification as Massachusetts Registry of Motor Vehicles instructor in driver education and driver training.

2 class hours.

Credit, 2.
Mr. BRIGGS.

89. (I) ATHLETIC INJURIES—PREVENTION AND CARE.—The use of proper, personal and field equipment, support methods, conditioning exercises, the medical examination, therapeutic aids, and the clinical use of physiotherapy equipment.

2 class hours.

Prerequisites, Physical Education 22, 51.

Credit, 2.
Mr. RICCI.

PHYSICAL EDUCATION FOR WOMEN

Professor TOTMAN, Miss HUBBARD, Mrs. HIBBARD, Miss RIGGS, Miss CAMP, Miss BOUIN.

7. (I) 8. (II) PHYSICAL EDUCATION.—Students are required to participate in one term of dancing, in one team sport, and to pass a safety test in swimming. Except for these requirements, all unrestricted students may select any activity which is offered. Fall season: field hockey, volleyball, soccer, archery, tennis, swimming. Winter season: basketball, volleyball, badminton, swimming, life saving (by permission), modern dance, square dance, calisthenics, posture training. Spring season: softball, soccer, archery, swimming, modern dance.

3 class hours.

Credit, 2.
THE DEPARTMENT.

27. (I) 28. (II) PHYSICAL EDUCATION.—The activities offered in Courses 7 and 8 are continued. In addition, advanced modern dance is offered in the fall season and water safety instruction in the winter season. Unrestricted students may select any activity which is offered.

3 class hours.

Credit, 2.
THE DEPARTMENT.

63. (I) 64. (II) TEACHING SPORTS FOR SECONDARY SCHOOLS.—Designed to give the fundamentals of teaching and officiating of team sports for women appropriate for the

secondary school level. Course content includes development and knowledge of techniques, knowledge of rules, teaching progressions, class procedures, and instruction in officiating related to the following activities: hockey, soccer, speedball, volleyball, basketball, and softball.

1 class hour; 3 laboratory hours.

Credit, 2.

THE DEPARTMENT.

65. (I) RHYTHMS AND DANCING FOR THE ELEMENTARY SCHOOL.—The course will include the development of rhythmic sense through basic motor skills; dramatizations; the construction of simple dance forms; folk dances and singing games. There will be practice in planning the rhythm and dance program in the elementary school from nursery school through sixth grade.

1 class hour; 3 laboratory hours.

Credit, 2.

THE DEPARTMENT.

66. (II) PLAY ACTIVITIES AND GAMES FOR ELEMENTARY SCHOOLS.—A study of the place of physical education in the schools with emphasis on procedures, organization, and teaching techniques. There will be more opportunity to learn games and other play activities for children from 5 to 14 years.

1 class hour; 3 laboratory hours.

Credit, 2.

THE DEPARTMENT.

PHYSICS

Professor POWERS, Professor ALDERMAN, Associate Professor ROSS,[†] Assistant Professor BURPO,* Assistant Professor WANNLUND, Assistant Professor MATHIESON, Assistant Professor FISHER, Assistant Professor WANG, Mr. CROOKER.

25. (I) MECHANICS, SOUND, AND HEAT.—This course is largely a study of the following and related topics; equilibrium of bodies; forms of energy and work; motion, fluids; surface tension; molecular phenomena; elasticity; wave-motion; sound; thermometry expansion; hygrometry; transmission of heat; changes of state; radiation.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 8 or its equivalent.

26. (II) LIGHT AND ELECTRICITY.—Includes wave-theory of light; optical instruments; analysis of light; interference; polarization; magnetism; electrostatics; production and prop-

* On leave of absence for military service.

[†] On leave of absence.

erties of electric currents; electrical appliances and machines; oscillatory circuits; vacuum tubes, and related topics.

3 class hours; 1 2-hour laboratory period. Credit, 4.

THE DEPARTMENT.

Prerequisite, Physics 25.

51. (I) 52. (II) MAGNETISM, ELECTRICITY, PHOTO-ELECTRICITY, THERMIONICS AND APPLICATIONS.—Course 51 deals with direct currents; Course 52 with alternating currents, applications of thermionics, and photo-electricity. These courses are planned to give the student a good training in theory and methods of measurement in the indicated subjects, which are useful in many fields of investigation. Modern methods are stressed and instruments of precision are used.

2 class hours; 1 2-hour laboratory period. Credit, 3.

8:00-8:50 Tu., Th.; 10:00-11:50 Tu. or 1:00-2:50 Tu. or W.

Mr. POWERS.

Prerequisites, Physics 26 and Mathematics 29 for Course 51; Physics 51 for Course 52.

55. (I) 56. (II) MECHANICS.—Development of the fundamental concepts of dynamics with applications to particles and rigid bodies in translation and rotation. One laboratory period may be substituted for one class hour.

3 class hours. Credit, 3.

9:00-9:50 Tu., Th.; laboratory by arrangement.

Mr. ROSS.

Prerequisites, Physics 26; Mathematics 30.

58. (II) PHOTOGRAPHY.—Class work and laboratory practice in the fundamentals of photography. Types of cameras, characteristics of photographic emulsions, exposure and exposure meters, processing of negative and prints, enlarging, composition. Limited to ten students.

2 class hours; 1 4-hour laboratory period. Credit, 3.

3:00-3:50 M. W.; 1:00-5:00 F.

Mr. POWERS.

60. (II) SOUND AND ACOUSTICS.—A study of vibrations, vibrating bodies, coupled systems, sound structure, and acoustic properties. The work will include many applications of sound to technical and commercial fields.

3 class hours.

Credit, 3.

Mr. ALDERMAN.

Prerequisite, Physics 55 or its equivalent.

61. (I) 62. HEAT AND THERMODYNAMICS.—A study of heat exchanges and energy changes due to heat in systems of matter. The subject material and experimental methods are useful in other branches of science.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu., Th.; 2:00-3:50 Th.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

63. (I) 64. (II) OPTICS.—An intermediate course in the theory of light. Work in geometrical and physical optics is done. Precision instruments are used in the laboratory.

2 class hours; 1 2-hour laboratory period. Credit, 3.
1:00-1:50 Tu., Th.; laboratory hours by arrangement.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

75. (I) 76. (II) ADVANCED EXPERIMENTAL WORK IN SELECTED TOPICS.—These courses are largely experimental and the subject matter is adapted to the needs of the individual student. The research viewpoint is emphasized. The class hour is used for a course in precision of measurements.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. WANNLUND

Prerequisites, Mathematics 29, 30; two of the following year courses: Physics 51-52, 55-56, 61-62, 53-64.

85. (I) 86. (II) MODERN PHYSICS.—Typical subjects studied are theories of the atom, radiation, quantum theory; spectra, X-ray analysis, nuclear reactions.

3 class hours. Credit, 3.

9:00-9:50 M. W. F.

Mr. ROSS.

Prerequisites, Physics 52, 62 and 64 or equivalent; Mathematics 30.

95. (I) 96. (II) ELECTRONICS.

2 class hours; 1 2-hour laboratory period. Credit, 3.

10:00-10:50 M. F.; 10:00-11:50 W.

Mr. POWERS, Mr. WANNLUND.

Prerequisites, Physics 51, 52; Mathematics 29, 30.

POMOLOGY

Professor FRENCH, Associate Professor ROBERTS, Assistant Professor O. G. ANDERSON, Mr. J. F. ANDERSON.

26. (II) SMALL FRUITS.—A study of the growing of raspberries, blackberries, strawberries, currants, blueberries, cranberries, and grapes, dealing with such questions as varieties, selecting a site for the plantation, soils, fertilizers, pruning, harvesting, and marketing.

2 class hours; 1 2-hour laboratory period. Credit, 3.

10:00-10:50 M. F.; 1:00-2:50 W. or F. Mr. O. ANDERSON.

53. (I) GENERAL POMOLOGY.—A study of the most improved practices in tree fruit production, including orchard sites and soils, laying out and setting the orchard, the structure and growth of fruit plants; the bearing habits, pruning, fertilizers, pollination; pest control; harvesting and marketing the crop.

2 class hours; 1 2-hour laboratory period. Credit, 3.

10:00-10:50 Tu., Th.; 3:00-4:50 Th. or F.

Mr. ROBERTS, Mr. J. ANDERSON.

56. (II) ORCHARD PEST CONTROL.—This course is especially designed to familiarize the student with: (a) spraying and dusting machinery; (b) methods in the application of materials used in orchards, with the important considerations for spraying each fruit and for combating each orchard pest; (c) preparation for use of the common fungicides and insecticides.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu., Th.; 1:00-2:50 Tu. Mr. O. ANDERSON.

57. (I) FRUIT JUDGING.—Practice in the identification, selection, and judging of fruit for exhibition purposes. From this class a team is selected to represent the University in Intercollegiate Fruit Judging Contests.

1 class hour. Credit, 1.
Hours by arrangement. Mr. O. ANDERSON.

75. (I) SYSTEMATIC POMOLOGY (1954-55).—A study of the more important kinds and varieties of fruits grown in the United States, their relationships and nomenclature. Particular emphasis is placed upon the identification, classification and value of varieties including a study of the characters of the plant as well as the fruit. Given in alternate years.

1 class hour; 3 2-hour laboratory periods. Credit, 4.
8:00-8:50 Tu.; 1:00-2:50 M. W. F. Mr. O. ANDERSON.

77. (I) COMMERCIAL POMOLOGY (1953-54).—A critical consideration of the picking, grading, packing, storing, and marketing of fruits. This course also considers the leading American and foreign centers of fruit production as they affect our own fruit industry through competition here or abroad. A two-day market trip will be required at an approximate cost of ten dollars. Given in alternate years.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 1:00-2:50 Tu. Mr. ROBERTS.

81. (I) 82. (II) ADVANCED POMOLOGY.—A consideration of the scientific principles governing the growth and behavior of fruit-bearing plants. Special attention is given to the more important research work in the field of pomology.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Hours by arrangement. Mr. FRENCH.
Prerequisite, Pomology 53.

83. (I) 84. (II) SEMINAR.—Advanced study of problems relating to fruit production.

1 class hour. Credit, 1.
Hours by arrangement. THE DEPARTMENT.

85. (I) 86. (II) CRANBERRY PROBLEMS.—For seniors specializing in cranberry technology. Selected readings and

individual work to familiarize students with the literature, research, and problems of the cranberry industry.

Credit, 2.
Hours by arrangement. Mr. FRENCH.

Plant Breeding

52. (II) PLANT BREEDING METHODS.—An advanced study of genetic topics peculiar to plants, also the methods and problems of the plant breeder. Laboratory work in genetic analysis and the breeding of plants.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 M. F.; 3:00-4:50 W. Mr. FRENCH.
Prerequisite, Zoology 53.

81. (I) 82. (II) SPECIAL PROBLEMS IN PLANT BREEDING.—Qualified seniors may carry on advanced study on special topics or undertake such original investigations as time and available material will permit.

Hours by arrangement. Credit, 2.
Mr. FRENCH.
Prerequisite, Plant Breeding 52.

POULTRY HUSBANDRY

Professor JEFFREY, Professor SANCTUARY, Assistant Professor BANTA, Assistant Professor VONDELL.

25. (I) GENERAL POULTRY.—For students not majoring in poultry husbandry. A general course giving an introduction to the breeds of poultry, the principles and practice of breeding, incubation, and poultry nutrition, brooding and rearing, houses and equipment, management practices, marketing poultry products, and the business of poultry keeping.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 M. F.; 10:00-11:50 or 3:00-4:50 Tu.
Mr. JEFFREY.

52. (II) INCUBATION AND BROODING.—This course is based upon the actual operation of incubators and brooders. Each year a research project is planned and data obtained concerning the effects of various incubator adjustments upon malpositions and male development of embryos and the percentage of hatch. Studies of temperature gradients, chick behavior and development are made in brooding with various types of equipment. Analysis is made of common and unusual field problems.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
11:00-11:50 W.; 3:00-4:50 M.; other hours by arrangement.
Mr. SANCTUARY.

53. (I) POULTRY JUDGING.—Physiological and anatomical characters are used in production judging. The American Standard of Perfection is employed in a study of the more

popular breeds and varieties, and for exhibition judging. Judging teams competing in the Eastern Intercollegiate Contest are trained in this course.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-8:50 Tu.; 1:00-2:50 Th. F.

Mr. BANTA.

55. (I) POULTRY HOUSING AND SANITATION.—In this course are considered the biological factors related to the proper physical environment necessary for growth, health, and reproduction. Various systems of ventilation and methods of insulation are studied and demonstrated by models. Humidity, temperature, and condensation studies are made at the poultry plant with varying adjustments of ventilation devices. A study is made of modern equipment. Sanitation from the standpoint of disease prevention practices is also considered.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

9:00-9:50 Th.; 1:00-2:50 Tu.

Mr. SANCTUARY.

56. (II) POULTRY NUTRITION.—A study of the scientific principles of nutrition, classification and identification of feedstuffs, formulation and calculation of rations for specific purposes. A class trip may be arranged.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 W.

Mr. BANTA.

75. (I) MARKETING POULTRY PRODUCTS.—A study of the preparation and grading methods of eggs and poultry products to meet the requirements of the northeastern markets. The laboratories are designed to cover the fields of modern dressing, processing and packaging of poultry; as well as grading, candling and quality studies of eggs. A one-half day class trip to Springfield markets in December is required. Estimated cost, two dollars.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

10:00-10:50 Tu.; 3:00-4:50 W.

Mr. VONDELL.

76. (II) TURKEY PRODUCTION.—This course includes the production of ducks and geese but most of the time is given to the turkey industry; its importance, breeds, breeding, incubation, brooding, feeding, finishing, marketing, etc.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

1:00-1:50 M.; 3:00-4:50 W.

Mr. VONDELL.

77. (I) POULTRY BREEDING.—The improvement of poultry by selection is developed through a study of the principles of heredity. The inheritance of morphological and physiological characters including plumage color, egg production, meat production, hatchability, egg traits, and disease resistance.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 M. W.; 1:00-2:50 W.

Mr. JEFFREY.

78. (II) SEMINAR AND FARM MANAGEMENT.—A combination seminar and lecture course designed to give the student a comprehensive view of all phases of the poultry industry. A field trip covering approximately three days will be arranged. Poultry majors with an average of 80 or more in poultry courses may elect an additional problem credit.

3 class hours; 1 2-hour laboratory period may be elected.

Credits, 3, 4.

9:00-9:50 M. W. F.

Mr. JEFFREY.

PSYCHOLOGY

Professor NEET, Associate Professor FELDMAN, Assistant Professor GOSS, Assistant Professor VALLANCE,[†] Assistant Professor MAUSNER, Mr. SAUNDERS, Mr. SPECTOR, Mr. FIELD, Dr. MICHELSON.

26. (I) and (II) GENERAL PSYCHOLOGY.—This is an introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. Topics considered include the nature and development of behavior, motivation, learning, problems of adjustment, intelligence, aptitudes, and personality.

3 class hours.

Credit, 3.

THE DEPARTMENT.

28. (II) GENERAL PSYCHOLOGY.—A continuation of Psychology 26. Topics considered include neural relationships, sensory processes, perception, thinking, emotions, social behavior, and individual differences.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

THE DEPARTMENT.

Prerequisite, Psychology 26.

51. (I) EXPERIMENTAL PSYCHOLOGY.—This course is designed to give an understanding of the problems, methods, and data of experimental psychology. One of the basic functions of the course is to acquaint the student with the scientific method as applied to psychological studies of behavior.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu. Th.; 1:00-2:50 Tu. W. or Th.

Mr. NEET.

Prerequisite, Psychology 26.

56. (II) EDUCATIONAL PSYCHOLOGY.—A study of psychological facts and principles fundamental to education, teaching, and personal relationships between teacher and pupil. Topics considered in relation to school situations are:

[†] On leave of absence.

physical and mental growth, intelligence, motivation, emotions, learning, transfer of training, and mental hygiene of teacher and pupil.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. MAUSNER.

Prerequisite, Psychology 26.

61. (I) SOCIAL PSYCHOLOGY.—The social behavior of the individual. Topics considered will include methods of studying social behavior, schools of social psychology, social behavior of animals, foundations of personality development, social (cultural) determinants of personality, social attitudes and their measurement, effects of collective situations on individual behavior, custom and conformity.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. MAUSNER.

Prerequisite, Psychology 26.

62. (II) SOCIAL PSYCHOLOGY (1953-54).—A survey of multi-individual phenomena. Topics to be considered are methods of studying collective action, leadership, morale, propaganda, nature and measurement of public opinion, behavior in crowd situations, social conflict and prejudice. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. MAUSNER.

Prerequisite, Psychology 26.

63. (I) PHYSIOLOGICAL PSYCHOLOGY.—A study of the relationships between physiological processes and behavior. Major emphasis will be placed upon the structure and mechanisms of the central nervous system and sense organs, endocrine functions, and drives.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. FELDMAN.

Prerequisites, Psychology 26; Zoology 35.

72. (II) ADVANCED EXPERIMENTAL PSYCHOLOGY.—The literature, techniques, and apparatus of experimental psychology are considered, and selected projects are carried out individually by the members of the class.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 Th.; 1:00-2:50 Tu. Th.

Mr. NEET.

Prerequisite, Psychology 51.

75. (I) STATISTICS IN PSYCHOLOGY.—The application of statistical procedures to the analysis of psychological data and to problems of measurement in psychology and related fields.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

2:00-2:50 M. F.; 3:00-4:50 W.

Mr. GOSS.

Prerequisites, Psychology 26; Statistics 79 or Mathematics 62.

81. (I) 82. (II) **PSYCHOLOGICAL TESTS.**—Different varieties of psychological tests are studied. The first semester considers group tests of intelligence, aptitude, interest, personality, and clinical tests. The second semester is devoted to a consideration of individual and performance tests of intelligence and to the nature and theories of intelligence. Practice will be given in administering, scoring, interpreting, and evaluating tests. Either semester may be elected independently.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
1:00-1:50 F.; 1:00-2:50 M. W. or 3:00-4:50 Tu. Th.

Mr. SAUNDERS.

Prerequisite, Psychology 26.

83. (I) **ABNORMAL PSYCHOLOGY.**—A study of the principles relative to the causes, symptoms, and treatment of behavior abnormalities. Special attention is given to the following: dynamics of behavior abnormalities, speech problems, emotional extremes, memory losses and other disorders of association, the neuroses and psychoses, and mental deficiency. Hospital trips and clinics.

3 class hours. Credit, 3.
10:00-10:50 M. W. F. Mr. NEET.

Prerequisite, Psychology 26.

86. (II) **INDUSTRIAL PSYCHOLOGY.**—A study of psychological principles and methods in business and industrial situations. Topics considered include: job analysis, job evaluation, employee selection and training, fatigue, techniques of motivation, measurement of morale and problems of leadership.

3 class hours. Credit, 3.
1:00-1:50 M. W. F. or 9:00-9:50 Tu. Th. S. Mr. SPECTOR.

Prerequisite, Psychology 26.

88. (II) **PSYCHOLOGY OF GUIDANCE.**—A study of the psychological principles, techniques and tests necessary in guidance. Practice is given in organizing and evaluating relevant data in the analysis of illustrative cases.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 Tu. Th.; 3:00-4:50 M. or W. Mr. FIELD.

Prerequisite, Psychology 26 and 81 or consent of the instructor.

90. (II) **CONTEMPORARY PSYCHOLOGIES.**—A logical, historical, and systematic analysis of contemporary psychological theories, including structuralism, functionalism, Gestalt and organismic psychologies, psychoanalysis, and behaviorisms from Thorndike and Watson to the contemporary scene.

3 class hours. Credit, 3.
2:00-2:50 M. W. F. Mr. Goss.

Prerequisite, Psychology 26.

92. (II) CLINICAL PSYCHOLOGY.—A study of the techniques and methods involved in the diagnosis and treatment of behavior disorders. Diagnostic clinical testing, counselling, and other psychotherapeutic procedures are given consideration. Hospital trips and clinics.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F. Mr. SAUNDERS, Dr. MICHELSON.

Prerequisite, Psychology 83 or consent of the instructor.

93. (II) PSYCHOLOGY OF ADOLESCENCE (1954-55).—A consideration of the development, and emotional, social, and intellectual adjustment of the individual during the adolescent years. Given in alternate years.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. Goss.

Prerequisite, Psychology 26.

94. (II) CHILD PSYCHOLOGY.—This course aims to develop an understanding of the behavior of the child. Psychological aspects of the following topics are considered: original nature, maturation and development of behavior, language, habit formation, emotional behavior, development of intelligence and understanding, social behavior, motivation, personality, and mental hygiene. Nursery school observation and practice.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. NEET.

Prerequisite, Psychology 26.

95. (I) 96. (II) PROBLEMS IN PSYCHOLOGY.—For qualified seniors. The student will be allowed to do independent work and study on special problems or in certain fields of psychological interest. By arrangement with the members of the department.

Credit, 1.

THE DEPARTMENT.

RELIGION

(Non-credit courses)

Rev. SYDNEY TEMPLE, Ph.D. Chaplain to Protestant Students,
 Rabbi LOUIS RUCHAMES, Ph.D., Chaplain to Jewish Students,
 Father DAVID J. POWER, Chaplain to Catholic Students.

Instructors: Rev. CHALMERS COE, B.D.; Rev. HOWARD

BOARDMAN, B.D.; Rev. JAMES LAIRD, Ph.D.;

Rev. LOWELL KANTZER, B.D.

15. (I) 16. (II) A HISTORY OF JEWISH THOUGHT AND CULTURE.—A survey of Jewish thought and culture from the Bible to contemporary times. Particular emphasis will be placed upon the relevance of such thought to contemporary religious and philosophical problems Among the thinkers to

be discussed will be Jeremiah, Ecclesiastes, Philo, Maimonides, Spinoza, Achad-Ha'am, and Will Herberg.

1 hour.

No credit.

Mr. RUCHAMES.

17. (I) 18. (II) BASIC BELIEFS OF JUDAISM.—Discussions of the basic principles and practices of the Jewish faith.

1 hour.

No credit.

Mr. RUCHAMES.

20. (II) 21. (I) RELIGIOUS FOUNDATIONS OF THE WEST.—The development of religious consciousness is considered against the background of the Old Testament record. The Bible text is critically surveyed in the light of national, cultural, and rational influences and as applicable to the contemporary religious situation. Course 20: The Law and Former Prophets; Course 21: Prophets and Writings.

1 hour.

No credit.

Mr. TEMPLE.

30. (II) 31. (I) ELEMENTS OF CHRISTIANITY.—The fundamentals of the Christian faith as found in the New Testament writings are studied critically and empirically, with special reference to their relevance for individual and social life in the contemporary world. Course 30: The Four Gospels; Course 31: Acts and Epistles.

1 hour.

No credit.

Mr. TEMPLE.

35. (I) DENOMINATIONS OF THE WEST.—A survey of the background, beliefs, and polity of the major Christian denominations. Investigation of trends and outstanding leaders with special reference to their contribution to American social and intellectual life.

1 hour.

No credit.

Mr. KANTZER.

36. (II) RELIGIONS OF THE EAST.—The Living religions of Asia are considered from the viewpoint of origins, basic beliefs, and modern developments. Contemporary exponents of these faiths are heard in person or studied through recent writings.

1 hour.

No credit.

Mr. TEMPLE.

41. (I) 42. (II) CATHOLIC FAITH AND PRACTICE.—Discussions of the Catholic Church dogmas and practices.

1 hour.

No credit.

Fr. POWER.

Courses 61-72 are open to juniors and seniors or to persons who have taken at least one semester of either

20-21 or 30-31. Exceptions are made only by special permission.

61. (I) THE UNDERSTANDING OF PERSONALITY.—The findings of modern psychology and psychiatry are interpreted in the light of the Christian faith so as to lead to a better understanding of the human personality. Courtship and marriage, vocation, personal and social attitudes are considered.
1 hour.

No credit.

Mr. LAIRD.

62. (II) SOCIAL ETHICS.—An examination of the Christian world view at it relates to the rights and duties of man in human society. The fundamental principles of justice, freedom, and love are considered in relation to their application in the areas of political and economic activity.
1 hour.

No credit.

Mr. BOARDMAN.

71. (I) RELIGION IN LIFE.—A practical approach to theology. The primary doctrines of the Christian Church are considered in the light of God's action and man's response, the place of the Church, and the task of the Christian today.
1 hour.

No credit.

Mr. TEMPLE.

72. (II) CHRISTIAN BELIEF.—An exposition and discussion of the articles of the Christian faith, with special attention to the scriptural basis of belief and its confirmation in the experience of the Church.
1 hour.

No credit.

Mr. COE.

Courses in Elementary and Intermediate Hebrew, and Elementary Yiddish are offered by Rabbi Ruchames. These are open to all students.

ROMANCE LANGUAGES

Professor FRAKER, Professor GODING, Assistant Professor CLARKE, Assistant Professor FERRIGNO, Assistant Professor JOHNSON, Mr. CESTRE, Mr. WEXLER, Miss TILLONA, Mr. GREENFIELD, Mr. LABARGE, Miss LIOTTA, Miss YEGELWEL.

French

1. (I) 2. (II) ELEMENTARY FRENCH.—For those who have had no previous French or whose preparation is insufficient for more advanced courses. Intensive drill for rapid reading, writing, speaking and understanding. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.
4 class hours.

Credit, 3.

THE DEPARTMENT.

5. (I) 6. (II) **ADVANCED INTERMEDIATE FRENCH.**—Readings from representative masterpieces of French literature. Composition, grammar review, intensive oral practice. 4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 1 and 2, or 2 years of high school French.

9. (I) 10. (II) **ORAL PRACTICE.**—Not open to freshmen except in conjunction with another course in French. Intensive oral practice, vocabulary study, grammar essentials for fluent speech. Recommended for those who desire a reasonably good command of the spoken language. 4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 3 and 4 or equivalent or permission of the instructor.

15. (I) 16. (II) **SURVEY OF FRENCH LITERATURE.**—Readings from representative masterpieces of French literature. Review of grammar. Composition, outside reading. Conducted in French except for one section conducted in English. 4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 5 and 6 or 3 years of high school French.

Advanced Courses

Prerequisites, French 15 and 16, or French 5 and 6 and permission of the instructor. Since most of the advanced courses are conducted in French, the student should have a reasonable oral command of the language before electing these courses. For this purpose the student is advised to take French 9 and 10, or spend one year in the French House.

29. (I) 30. (II) **FRENCH LITERATURE OF THE SEVENTEENTH CENTURY (1953-54).**—A survey of the Classic period, with readings from representative works. Given in alternate years. 3 class hours.

Credit, 3.

Mr. FRAKER.

31. (I) 32. (II) **FRENCH LITERATURE OF THE NINETEENTH CENTURY (1952-53).**—A detailed study of the more important authors and movements. Given in alternate years. 3 class hours.

Credit, 3.

Mr. GODING.

51. (I) **FRENCH LITERATURE OF THE EIGHTEENTH CENTURY (1954-55).**—*Rosseau: The Encyclopedists.* Given in alternate years. 3 class hours.

Credit, 3.

Mr. FRAKER.

52. (II) VOLTAIRE (1952-53).—A study of the Eighteenth Century through the life and works of Voltaire. Given in alternate years.

3 class hours.

Credit, 3.
Mr. FRAKER.

53. (I) 54. (II) FRENCH LITERATURE OF THE TWENTIETH CENTURY.

3 class hours.

Credit, 3.
Miss CLARKE.

75. (I) 76. (II) COURSE DE STYLE.—A study of syntax and idioms at an advanced level. The student is taught how to express himself clearly and logically in living French.

4 class hours.

Credit, 3.
Mr. CESTRE.

79. (I) FRENCH CIVILIZATION (1953-54).—A study of those elements which lie back of the cultural contribution of France to the world civilization. Subjects studied will include arts, sciences, school systems, the press, the family, social classes, influences of history and geography. The assigned readings will be drawn from contemporary French literature. Given in alternate years.

4 class hours.

Credit, 3.
Mr. GODING.

80. (II) ADVANCED LANGUAGE STUDY (1953-54).—Methods, outside readings, observations, reports, practice. Given in alternate years.

4 class hours.

Credit, 3.
Mr. GODING.

82. (II) ADVANCED GRAMMAR, COMPOSITION, AND PHONETICS.—Recommended for majors who intend to teach.

4 class hours.

Credit, 3.
Mr. GODING.

Italian

51. (I) 52. (II) ELEMENTARY ITALIAN.—An introductory course for those who have had no previous Italian or whose preparation is insufficient for more advanced work. Training in grammar, composition, pronunciation, with special emphasis on reading.

4 class hours.

Credit, 3.
Mr. FERRIGNO.

75. (I) 76. (II) INTERMEDIATE ITALIAN.—Primarily a reading course with considerable attention to review of grammar, and speech.

4 class hours.

Credit, 3.
Mr. FERRIGNO.

Spanish

1. (I) 2. (II) **ELEMENTARY SPANISH.**—Grammar, exercises in composition and conversation, reading of selected short stories. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours; 4th hour optional. Credit, 3.

Mr. FRAKER, Mr. FERRIGNO.

7. (I) 8. (II) **INTERMEDIATE SPANISH.**—Readings from modern authors; grammar review.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. FERRIGNO.

Prerequisites, Spanish 1 and 2 or three years of high school Spanish.

9. (I) 10. (II) **ORAL PRACTICE.**—Intensive oral practice, vocabulary study, grammar essentials for fluent speech.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. WEXLER.

Prerequisites, Spanish 25 and 26, or permission of the department.

25. (I) 26. (II) **SURVEY OF SPANISH LITERATURE.**—Readings from representative authors. Composition, outside readings.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. FERRIGNO.

Prerequisites, Spanish 7 and 8, or equivalent.

29. (I) **THE ROMANTIC PERIOD (1952-53).**—Readings from representative authors; written and oral composition. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. FRAKER.

Prerequisites, Spanish 25 and 26.

30. (II) **THE MODERNISTS (1952-53).**—Dario, Nervo and their contemporaries; composition and conversation. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. FRAKER.

Prerequisite, Spanish 29.

73. (I) 74. (II) **THE GOLDEN AGE (1953-54).**—Readings from Cervantes, Lope de Vega, Calderon, Garcilaso and others. Composition and conversation. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. FRAKER.

Prerequisites, Spanish 25 and 26.

Russian

51. (I) 52. (II) **ELEMENTARY RUSSIAN.**—Grammar, exercises in composition and conversation, selected readings. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

4 class hours.

Credit, 3.
Mr. GABRYS.

Prerequisite, previous language training.

SOCIOLOGY

Professor KORSON, Assistant Professor KING, Mr. DRIVER,
Mr. MANFREDI, Mr. LINDSTROM.

28. (I) and (II) **INTRODUCTION TO SOCIOLOGY.**—An outline study of the social order, and of the individual considered as a member of his various groups.

3 class hours.

Credit, 3.
THE DEPARTMENT.

51. (I) **URBAN SOCIOLOGY.**—A comparative study of modern social conditions, and methods of adjustment, with special reference to city environment. Characteristics of the population, urban ecology, and problems of adjustment in the fields of housing, health, education, and recreation.

3 class hours.

2:00-2:50 Tu. Th., third hour by arrangement.

Credit, 3.

Mr. MANFREDI.

Prerequisite, Sociology 28.

52. (II) **RURAL SOCIOLOGY.**—A study of rural society from the standpoint of its population, institutions, standards of living, and their relation to urban society.

3 class hours.

Credit, 3.
Mr. KORSON.

Prerequisite, Sociology 28.

53. (I) **AN INTRODUCTORY STUDY OF CULTURAL ANTHROPOLOGY.**—A non-technical sociological study of man in pre-literate societies.

3 class hours.

Credit, 3.
Mr. LINDSTROM.

Prerequisite, Sociology 28.

54. (II) **RACE RELATIONS.**—The social, economic, and political aspects of racial problems in the United States, with particular reference to the Negro and major ethnic groups. A rabbi, minister, and priest are invited to address the class, and visits are made to the respective churches.

3 class hours.

Credit, 3.
Mr. KORSON, Mr. KING.

Prerequisite, Sociology 28.

57. (I) THE FAMILY.—The study of the development of the customs of courtship and marriage from the primitive to the contemporary American family. The basic causes of changes and trends of the family are considered. Such topics as mate selection, marital laws, marital prediction, husband-wife relations, and the role of the child are considered.

3 class hours.

Credit, 3.

Mr. KING, Mr. KORSON.

Prerequisite, Sociology 28.

61. (I) POPULATION PROBLEMS.—An analytical study of population trends and problems of the world; the origin, composition, growth, migration, and urbanization of the American population. A consideration of population pressure as a cause of migratory movements.

3 class hours.

Credit, 3.

Mr. LINDSTROM.

Prerequisite, Sociology 28.

68. (II) INDUSTRIAL SOCIOLOGY.—A study of the role, status, and function of the worker in the industrial community. A consideration of changing technology, resulting social change and the adjustments made in the industrial community.

3 class hours.

Credit, 3.

Mr. KORSON.

Prerequisite, Sociology 28.

75. (I) SOCIAL PROBLEMS.—A study of abuses affecting the home, recreation, business, industry, family, welfare, public health, government, mental disease, and crime. The charitable and correctional institutions of Massachusetts as agencies of reform. Visits to Belchertown State Schools, Northampton State Hospital and Northampton Superior Court are arranged, and specialists in their fields will be invited as speakers.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. DRIVER.

Prerequisite, Sociology 28.

76. (II) INTRODUCTION TO SOCIAL WELFARE.—For senior majors and others who qualify. Contemporary problems of social concern: causes of poverty; methods of caring for adult and child dependents and defectives. A consideration of public and private agency administration and techniques, and an examination of federal, state, and local community programs.

3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisites, Sociology 28, 75.

78. (II) CRIMINOLOGY.—A study of the nature of crimes and the factors underlying criminal behavior. Attention is

also given to the machinery of justice in criminal behavior: the law, the courts, police enforcement, penal and correctional institutions.

3 class hours.

Credit, 3.
Mr. DRIVER.

Prerequisites, Sociology 28, 75.

3 class hours.

Credit, 3.

79. (I) 80. (II) SEMINAR.—Admission by permission of instructor. A study of the methods of research employed by social scientists. Students, under direction of the instructor, analyze and organize such sociological material as they gather through their own research. Projects must be approved in advance by the instructor.

Credit, 3.
Mr. DRIVER.

Hours by arrangement.

82. (II) SOCIOLOGICAL THEORY.—An examination of the contributions of European and American writers who have concerned themselves with theories of the origin, growth, and development of human social organization.

3 class hours.

Credit, 3.
Mr. MANFREDI.

Prerequisite, Sociology 28, 53.

SPEECH

Associate Professor NIEDECK, Assistant Professor ZAITZ,
Mr. PEIRCE, and the INSTRUCTORS IN ENGLISH.

3. (I) 4. (II) PUBLIC SPEAKING.—This course is designed to give the student introductory instruction and opportunity in oral self-expression and includes both public speaking and literary interpretation. Scheduled under English 1, 2.

1 class hour.

Credit, 1.
THE DEPARTMENT.

51. (I) VOICE AND DICTION AND ORAL INTERPRETATION.—The course is divided into five weeks of training and drill in the correct production of speech, followed by ten weeks of practice in the fundamentals of vocal interpretation of literature. It is possible for a student to take the five weeks of voice and diction and receive one credit.

3 class hours.

Credit, 1 or 3.
Mr. ———.

61. (I) FUNDAMENTALS OF BROADCASTING.—A general introduction to broadcasting: practice in preparing, rehearsing, and producing programs of various types.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. ZAITZ.

71. (I) SCENE DESIGN AND CONSTRUCTION.—Theories and design in the modern theatre with assignments in developing

stage settings from sketches to working drawing; from scenery construction to painting.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. ———.

75. (I) ACTING AND MAKE-UP.—The course is roughly divided into ten weeks of study of emotion and imagination in acting, reading lines, rehearsing, diction, and bodily action; and five weeks of study and application of the principles of stage make-up.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. ———.

76. (II) STAGE DIRECTION.—Study and practice in the fundamentals of directing a play. Recommended for those taking only one course in Drama.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. ———.

78. (II) STAGE LIGHTING.—Introduction to lighting a stage. Analysis of basic types of equipment and their application in artistic productions. Simple wiring and installations.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. ———.

89. (I) DRAMATIC PRODUCTION.—This course offers instruction and practice in casting, directing, make-up, lighting, and scenic design and construction.

3 2-hour laboratory periods. Credit, 3.
Mr. NIEDECK.

91. (I) (II) EXTEMPORE SPEECH.—The theory and practice of public speaking for business and professional purposes.

3 class hours. Credit, 3.
Mr. NIEDECK, Mr. ZAITZ, Mr. PEIRCE.

92. (II) FORMAL DISCUSSION.—Most of the semester is devoted to formal discussion: its organization and presentation. Students are given the opportunity to lead and to participate in discussions of current problems.

3 class hours. Credit, 3.
Mr. ZAITZ.

Prerequisite, Speech 91.

94. (II) PERSUASION.—Advanced study and practice in appeals to beliefs and actions through extemporaneous speech.

3 class hours. Credit, 3.
Mr. ———.

Prerequisite, Speech 91.

VETERINARY SCIENCE

Professor BULLIS, Professor SMITH.

75. (I) **COMPARATIVE VETERINARY ANATOMY.**—A study of the structure of vertebrates with emphasis upon the comparative structure of domesticated animals, both mammals and birds.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.
Mr. SMITH.

76. (II) **GENERAL VETERINARY PATHOLOGY.**—An introduction to the study of disease—causes, transmission, structural changes, and defense mechanisms; and the application of these principles to the prevention, control, and eradication of the common communicable and non-communicable diseases of farm animals.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.
Mr. SMITH.

Prerequisite, Veterinary Science 75.

78. (II) **GENERAL VETERINARY PATHOLOGY.**—This course is similar to Veterinary Science 76 except that diseases of importance to wildlife, and diseases of animals transmissible to man will be considered.

3 class hours.

Credit, 3.
Mr. SMITH.

Prerequisites, Bacteriology 31, Zoology 35 or 71.

88. (II) **AVIAN PATHOLOGY.**—This course is similar to Veterinary Science 76 but with application to specific communicable and non-communicable diseases of poultry.

3 class hours.

8:00-8:50 M. W. F.

Credit, 3.
Mr. BULLIS.

Prerequisite, Veterinary Science 75.

ZOOLOGY

Professor WOODSIDE, Associate Professor SNEDECOR, Assistant Professor TRAVER, Assistant Professor BARTLETT, Assistant Professor ROLLASON, Assistant Professor ANDREWS, Assistant Professor NUTTING, Assistant Professor RAUCH, Mr. HONIGBERG, Mr. DEARDEN, Mr. SWENSON, Mr. ROBERTS.

1. (I) and (II) **INTRODUCTORY ZOOLOGY.**—This course provides an introduction to the principles of biology, with special reference to the zoological aspects. The structure and activities of a representative vertebrate animal, the frog, are considered in detail and the knowledge thus gained is utilized in a comprehensive survey of the major groups of the animal kingdom. Brief introductions are given to the principles of

classification, nutrition, structure and functions of protoplasm, genetics, heredity, development, and evolution.

2 class hours; 1 3-hour laboratory period. Credit, 3.
11:00-11:50 M. W. or 2:00-2:50 M. W. or 3:00-3:50 Tu. Th.;
laboratory hours as sectioned.

THE DEPARTMENT.

25. (I) SURVEY OF THE ANIMAL KINGDOM. — Lectures emphasize those aspects of the zoological sciences which are least stressed in the introductory course; the principles of classification; ecology; economic importance; and the history of zoology in relation to man's progress. The laboratory work will include several exercises in field work; studies on representatives of phyla not covered previously; the morphological adaptations of animals to special modes of existence; and some simple zoological techniques.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 M. F.; 1:00-2:50 Tu. or W. or Th.

Mr. NUTTING.

Prerequisite, Zoology 1.

35. (I) and (II) VERTEBRATE PHYSIOLOGY.—An introductory course which will include consideration of circulation, respiration, digestion, metabolism, excretion, chemical and nervous coordination, muscular activity, and reproduction. The laboratory work will acquaint the student with some of the equipment and methods used in physiological studies, with emphasis on the experimental approach to the laboratory exercises.

2 class hours; 1 3-hour laboratory period. Credit, 3.

Mr. SNEDECOR, Mr. SWENSON, Mr. ROBERTS.

50. (II) HISTOLOGY OF THE VERTEBRATES.—A study of the types of tissues found in the body of vertebrate animals, and of the organs in which these tissues occur. Tissues and organs of mammals are emphasized. A knowledge of comparative anatomy is advised.

2 class hours, 1 3-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 2:00-4:50 Tu. or 1:00-3:50 W.

Mr. ROLLASON.

Prerequisite, Zoology 1.

51. (I) and (II) MICROTECHNIQUE OF ANIMAL TISSUES. —The course comprises (1) a consideration of the principles and methods of microtechnique as applied to animal tissues, and (2) a series of practical exercises in the preparation of animal tissues for microscopic examination. Registration is limited to 12 students per semester. Consult instructor for section assignments.

2 2-hour laboratory periods.

Credit, 2.

Mr. HONIGBERG.

Prerequisite, Zoology 1.

53. (I) **PRINCIPLES OF GENETICS.**—Lectures and laboratory experiments concerning the laws governing the transmission of hereditary factors in plants and animals, expression and action of genes, population genetics, and the relationship of genetics to other biological sciences.

2 class hours; 1 3-hour laboratory period. Credit, 3.
11:00-11:50 W. F.; 1:00-4:00 M. or 2:00-5:00 F., or 9:00-12:00 Tu. Mr. RAUCH.

Prerequisite, Zoology 1.

54. (II) **NATURAL HISTORY—PHYSICAL.**—Designed to orient students to the features of sky, climate and terrain which are of prime importance to the teaching naturalist. Collection, recording, preservation, and the use of natural objects will be stressed. Biological data will also be obtained as the season dictates.

1 class hour; 1 4-hour laboratory period. Credit, 3.
11:00-11:50 Tu.; 1:00-5:00 F. Mr. NUTTING.

Prerequisites, Botany 1, Zoology 1, Geology 27, Wildlife Management 27.

55. (I) **NATURAL HISTORY—BIOTIC.**—An extension of Zoology 54 with emphasis upon the fauna and flora. This course is primarily concerned with the development, local distribution, responses, and interrelationships of these organisms. Their position with respect to the physical environment will be discussed in some detail.

1 class hour; 1 4-hour laboratory period. Credit, 3.
11:00-11:50 Tu.; 1:00-5:00 F. Mr. NUTTING.

Prerequisites, Botany 26, Zoology 54.

56. (II) **NATURAL HISTORY—FIELD STUDIES.**—A program of extensive field work growing out of preparation in Zoology 54 and 55. Emphasis upon seasonal differences in abundance and stage of development of our fauna and flora.

1 class hour; 1 2-hour laboratory period. Credit, 2.
1:00-1:50 W.; 2:00-3:50 W. Mr. NUTTING.

Prerequisite, Zoology 55 and permission of instructor.

69. (I) **ANIMAL PARASITOLOGY.**—Representative protozoan and helminthic parasites of man and domestic animals are studied, with special reference to their morphology and life cycles. Emphasis is placed upon parasitism as a mode of life; on host-parasite relationships; on vectors, and other modes of transmission; and on methods of control of certain of the more important human parasites.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Miss TRAVER.

Prerequisite, Zoology 1.

70. (II) **ADVANCED INVERTEBRATE ZOOLOGY.**—A survey of the phyla of invertebrate animals from evolutionary and

phylogenetic aspects. Morphology, modes of nutrition and reproduction, interrelationships with other animals, and distribution in time and space, are considered, as well as classification. For each phylum, representatives of the principal classes are studied. Marine, terrestrial and freshwater forms are included.

1 class hour; 2 3-hour laboratory periods.

Credit, 3.

Miss TRAVER.

Prerequisite, Zoology 25 or equivalent.

71. (I) COMPARATIVE VERTEBRATE ANATOMY.—A thorough study of the anatomy of the vertebrates, with emphasis on the evolution, special modifications, and functional interrelationships of each of the organ systems. A systemic approach in both lecture and laboratory work. Animals studied in the laboratory are: protochordates, lamprey, dogfish, mudpuppy, and cat.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu. Th.; 1:00-3:50 W. F. or 2:00-4:50 Tu. Th.

Mr. BARTLETT, Mr. DEARDEN.

Prerequisite, Zoology 1.

72. (II) VERTEBRATE EMBRYOLOGY.—Lectures and laboratory work dealing with the development of representative animals, special emphasis being placed on the amphibian, bird and mammal.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

1:00-1:50 Tu. Th.; 2:00-4:50 W. F. or 2:00-4:50 Tu. Th.

Mr. WOODSIDE, Mr. RAUCH.

Prerequisite, Zoology 71.

73. (I) GENERAL CYTOLOGY (1953-54).—A consideration of the morphological features of cells in relation to their function. Lectures, seminar reports and laboratory work will deal with cytoplasmic structure and inclusions and nuclear phenomena. Given in alternate years.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. ROLLASON.

Prerequisites, Zoology 50, 51.

74. (II) LIMNOLOGY (1953-54).—The study of inland waters, emphasizing the geological, physical, chemical and biological aspects of this problem. Standard methods for making physical and chemical collections, tests and measurements are used by students on the numerous field trips. Biological material collected in the field is studied in the laboratory. Given in alternate years.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Miss TRAVER

in cooperation with the departments of Botany, Entomology, Geology, Public Health, and Zoology.

Prerequisites, Botany 1, Zoology 1, Chemistry 1, 2, and permission to register. Strongly recommended: Botany 25, 26, Entomology 26, Zoology 25, Geology 27, 28, Chemistry 29, 30.

80. (II) ORNITHOLOGY.—An introduction to the study of ornithology which aims to serve as a basis for further technical study or for the development of a life-time hobby. Lectures are of a general nature covering as many branches of ornithological knowledge as possible. Laboratory work includes field identification and the anatomy of the pigeon.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

8:00-8:50 Th.; 3:00-4:50 M. F.

Mr. BARTLETT.

Prerequisite, Zoology 1.

81. (I) VERTEBRATE ZOOLOGY.—An introduction to the vertebrates, their classification and ecology, with particular emphasis on the fishes. Field trips for the study of local fauna will be included as a part of the laboratory exercises. Course limited to eighteen students.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 1:00-2:50 Tu. Th.

Mr. ANDREWS, Mr. BARTLETT.

Prerequisite, Zoology 1.

82. (II) MAMMALOGY (1952-53).—The paleontology, taxonomy, speciation, natural history, range and distribution of the class Mammalia. Primary emphasis will be placed upon the study of local fauna, including at least one week-end collecting trip as part of the laboratory exercises. Course limited to fifteen students. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. DEARDEN.

Prerequisites, Zoology 1 and permission of instructor.

83. (I) COMPARATIVE PHYSIOLOGY.—A course designed to familiarize students with physiological principles and adaptations to the environment of animals throughout the invertebrate and vertebrate phyla. In the laboratory the experimental method will be developed involving general procedures and individual problems.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Mr. ROBERTS.

Prerequisites, Zoology 1, 35.

84. (II) GENERAL CELLULAR PHYSIOLOGY.—The properties and processes common to all organisms, including protoplasmic organization, permeability, metabolism, movement, bioelectricity, and reproduction.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Mr. SWENSON.

Prerequisites, one year biology; organic chemistry.

85. (I) CLASSES OF ARTHROPODS OTHER THAN INSECTS.—Arthropods are studied from the phylogenetic standpoint, with special reference to their relationship to the origin and evolution of insects.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 Tu.; 1:00-2:50 Tu. Th. Mr. HANSON.

86. (II) FISHERY BIOLOGY.—Theory in the practice of regulating freshwater fisheries: the physical and biological conditions of the environment and their influence on fish populations.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. ANDREWS.

Prerequisite, Zoology 81 and permission of instructor.

87. (I) ENDOCRINOLOGY.—Emphasis will be directed toward the importance of the endocrines in their control over normal functions (growth, metabolism, reproduction, etc.), in a variety of animals.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mr. SNEDECOR.

Prerequisite, Zoology 1.

91. (I) 92. (II) SPECIAL PROBLEMS IN ZOOLOGY.—Qualified graduate students and seniors who have met departmental requirements for specialization in the field of zoology may arrange for work on a special problem in zoology.

Credit, 3.

THE DEPARTMENT.

Invertebrate Zoology, Marine Biological Laboratory,
Woods Hole, Massachusetts. Credit, 3.

Invertebrate Embryology, Marine Biological Laboratory,
Woods Hole, Massachusetts. Credit, 3.

DEGREES CONFERRED 1952

RECIPIENTS OF HONORARY DEGREES

Frank Porter Washburn—*Master of Agriculture*
Howard Lawton Knight—*Doctor of Agriculture*
Otto Degener—*Doctor of Science*
Albert Francis McGuinn, S. J.—*Doctor of Science*
James Emerson Greenaway—*Doctor of Humane Letters*
William Lawson Machmer—*Doctor of Laws*

BACHELOR OF SCIENCE

Summa Cum Laude

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George Robert Stephens, Jr.

Magna Cum Laude

Halsey Leonard Allen, III
Eunice Joan Diamond
Muriel Doris Fauteux
Melwyn Benjamin Fine

Sumner Harold Gochberg
Mae-Louise Jezyk
Edward Lewis Parsons
Jean Sanborn

Cum Laude

Paul Raymond Bourdeau
Edna Claire Dick
Robert Bernard Eckberg
Stanley Sumner Glick

Aaron Kornetsky
James Damford Pomeroy
Ruth Marie Ryerson
Evelyn Ann Yeutter

Rite

Herman Clifford Abbott
Frederick Oliver Ames
Arlene Ruth Arons
George Atkins
Clifford Joseph Audette
Carl Frederick Aylward
Edgar Linus Bacon
John Howard Baker
Edwin Mark Bartos
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Irene Evelyn Bertelsen
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Barbara June Brown
Thurl Dryden Brown
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Paul Elliott Burke
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Joyce Lorna Clements
Donald William Clifford
Demeter John Coparanis
Chesley William Corkum
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Martin Sherman Cryan
Donato Francesco Dagnoli
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 Alan Robert Pehrson

Cum Laude

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 *Francis Henry Wysocki
 Eleanor Irene Zamarchi
 *Doris Hellerman Zucker

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 Robert John Blinn
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 Henry Philip Boynton
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 Frank Clisby Bunker
 John Thomas Cleary
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 Fred Boyd Cole

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Cum Laude

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Rite

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Krikor Ermonian	Douglas Nicholas
Maurice Patrick Fenton	Richard G. Pettingell
Carl Putnam Gates	*Patrick Frank Tobin
Stephen Joseph Golas	Isadore Louis Vivaldi

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Summa Cum Laude

Thomas Grant Walkinshaw

Cum Laude

Edward Charles Stotz

Rite

Howard Perley Aldrich
 Cornelius George Bellas
 Frank Raymond D'Argento
 Osvaldo Thomas Dellasanta
 Leonard Gordon Doak
 Frederick Cameron Duncanson
 Andrew Francis Fenton
 Arthur Hector Fortier
 John Walter Handforth
 William Brendon Harrington
 Frederick Lee Helene

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 Dudley Francis Irwin
 Jarl Orville Johnson
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 Robert Frederick Kempf
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 George Salame
 *Gerhard Rudolph Sievers
 Charles Francis Taylor
 John Brian Touher
 Allison Howes Whorf

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Cum Laude

Richmond William Hathaway

*Frederick Brinson Seel

Rite

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 Charles William Baker, Jr.
 Stephen A. Bara
 Norman Edwin Barbeau
 Harry Edward Brennan
 *Robert Ernest Brent
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 *Francis Gerard Casey
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 *Leon Thomas Chaskes
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 Roger Chapman Dean
 William Edward Dunn, Jr.
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 Richard Joseph Footit
 Joseph Anthony Kmiec

Eugene Francis Kowalik
 Herbert Ernest Lindner
 Jeremiah Anthony LoConte
 Allan Robert McKinnon
 Brian Finlay Milne
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 Daniel Herbert Palkowski
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 Robert Myer Sirull
 Stephen Jackman Sorrow
 Roscoe Otis Spooner
 William John Stanley, Jr.
 Edward Michael Tatarzycki
 Edward Francis Wilk
 Norman Eric Willard
 Edward Hawley Williams

Robert Frederick Wilson

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Kenneth Walter Avery

Owen Maurice Rogers

BACHELOR OF LANDSCAPE ARCHITECTURE

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 Joan Amy Forbes Cascio

Donald Robert Fairman
 Kenneth F. Yee

MASTER OF SCIENCE

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 Milton P. Baldauf
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 William J. Carney

James Luther Chamberlain, Jr.
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 Horace Freestone Clay
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 Kivi Grebber
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 Joyce Gibbs Harrington
 James Andrew Higgins
 James H. Horth
 Yun Kung Hsu
 Aino Jarvesoo
 Harry H. Johnson
 Elizabeth Kobak
 Paul Anthony Lane
 John E. LaPlante
 Henry W. Lawrence
 Kenneth Andrew LeClair
 Lewis P. Lipsitt
 Mary Jane McCarthy
 Bradford S. MacNulty
 Raymond E. Malloy
 Pericles Markakis
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 James O. Martin

John Robert Newman
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 Bernardo Poloni-Grossman
 Joseph B. Porter
 John S. Pullman, Jr.
 Eugene Charles Putala
 John W. Reilly
 Robert A. Rotan, Jr.
 Allen Otto Sachs
 Frederick A. Siino
 David Skolnick
 Helen Ann Slosberg
 Stanley L. Smith
 William Francis Smith
 Alberta Carol Snow
 Oddvar Solstad
 George A. Sousa
 Edward R. Taddeo
 Phyllis Ann Tatt
 Patrick A. Thibeau
 Albert H. Toczydlowski
 Wallace Waloweeck
 Bernard F. Walsh
 John A. Weidhaas, Jr.
 Patrick Henry Welch

Melvin L. Zabar

MASTER OF ARTS

Gerald Sanford Bernstein
 Rosemary Clair Brown
 Howard Harris Christian
 William John Harrington

Patsy Iampietro
 John Minitier
 Robert Dyfrig Ostle
 Robert Darrell Stearns

Helen McDuffee Witton

DOCTOR OF PHILOSOPHY

William Wesley Cantelo—*Entomology*
 Jehangir Darasha Contractor—*Food Technology*
 Frank H. Dalton—*Food Technology*
 George Francis Edmunds, Jr.—*Entomology*
 Hilal Elsayed El-Hattab—*Agronomy*
 Richard L. Hiner—*Food Technology*
 Marcel D. Labbee—*Food Technology*
 Kuang-Chiu Li—*Food Technology*
 Gideon E. Livingston—*Food Technology*
 Edwin I. Stoltz—*Food Science*
 Mahlon C. Tatro—*Food Technology*
 Carrick Earl Wildon—*Floriculture*
 Shou-Shih Yang—*Food Technology*

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UNIVERSITY OF MASSACHUSETTS ENROLLMENT SEPTEMBER 1952

UNDERGRADUATE COLLEGE

Class	1953		1954		1955		1956		Total		
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Total
Liberal Arts	92	79	76	123	85	168	127	184	380	554	934
Science	82	35	105	47	97	65	108	103	392	250	642
Engineering	65	1	67	0	129	1	212	1	473	3	476
Bus. Administration	65	9	80	5	127	12	108	7	380	33	413
Agric. & Hort.	63	9	101	8	94	4	89	10	347	31	378
Home Economics ..	0	51	0	58	0	82	0	102	0	293	293
Phys. Ed. for Men ..	13	0	11	0	11	0	25	0	60	0	60
Specials									16	11	27
	380	184	440	241	543	332	669	407	2048	1175	3223

GRADUATE SCHOOL

Men	Women	Total
240	34	274

STOCKBRIDGE SCHOOL

Class	1953	1954	Total
Men	110	177	287
Women	1	6	7
			294

SUMMER SCHOOL

Men	Women	Total
319	116	435

SUMMARY (September 1952)

Undergraduate College	3223
Graduate School	274
Stockbridge School	294

TOTAL ENROLLMENT

3791

Office of Publications, November 1952

GIFTS AND BEQUESTS

For the information of those who may wish to make a gift or a bequest to this University, the following suggestion is made as to a suitable form which may be used.

There are a number of worth-while activities of the University which are handicapped by lack of funds and for which small endowments would make possible a greater measure of service to our students and to the Commonwealth. The religious work on the Campus is an example. This is now carried on in a very limited way by current private contributions. Further information concerning this and other activities in similar need will be gladly furnished by the President.

SUGGESTED FORM

"I give and bequeath to the Trustees of the University of Massachusetts, at Amherst, Massachusetts, the sum of dollars."

(1) (Unrestricted)

"To be used for the benefit of the University of Massachusetts in such manner as the Trustees thereof may direct."

or (2) (Permanent Fund: income unrestricted)

"to constitute an endowment fund to be known as the Fund, such fund to be kept invested by the Trustees of the University of Massachusetts and the income used for the benefit of the College in such manner as the Trustees thereof may direct."

or (3) (Specific Purposes)

"to be used for the following purposes,"

(Here specify in detail the purposes.)

Bulletin

*The University
of Massachusetts*

REPORT OF THE PRESIDENT

to the Board of Trustees, the Governor, and Citizens
of the Commonwealth

JANUARY, 1952 TO JANUARY, 1953



February 12, 1953

The Honorable Joseph W. Bartlett
Chairman, Board of Trustees
The University of Massachusetts

Sir:

I have the honor to present through you to the Board of Trustees for transmission to the Governor of the Commonwealth the annual report of the University of Massachusetts for the year ending January 1, 1953.

Respectfully submitted,

RALPH A. VAN METER, *President*

VOLUME XLV

APRIL 1953

NUMBER 3

Published five times a year by the University of Massachusetts: January, February, April (two), May. Entered at Post Office, Amherst, Mass., as second-class matter.

The report of the President for the year ending January 1, 1953, is part of the 90th annual report of the University of Massachusetts, and as such is Part I of Public Document 31. (Section 8, Chapter 75, of the General Laws of Massachusetts.)

President's Report

1952

This is my sixth report as President of the University. In the past six years the University has had fine and continuing support from this Board of Trustees, from successive legislatures, from state officials, from the alumni and from a host of others interested. This support has been a key factor in the growth and development that has characterized this period.

Because the most important work of the University is teaching and research, perhaps the most significant event of the past year at the University was the admission in September of an entering undergraduate class of 1076—669 men and 407 women. It may be said of this class, as it may be said of every entering class since the end of World War II, that this is the largest entering class in our history. Its significance, however, is not that it is the largest, but that it is only slightly larger than the previous entering class of 1045 freshmen in September, 1951. This slight increase is an indication that the University has entered a new period of gradual growth following the period of emergency growth in the years immediately following World War II.

The period of emergency growth was marked by relatively large increases each year in the number of freshmen the University could accept while maintaining proper teaching standards. The 1951 class of 1045 freshmen, for example, was a fourth larger than the record class of 847 admitted in 1950. This 1950 class, in turn, was a third larger than the record class of 621 admitted in 1949. This 1949 class, in turn, was almost 50 per cent larger than the record class of 471 admitted in 1948. This 1948 class was only slightly larger than the 415 admitted in September 1947—although the University was stretched to the limit of its capacity then, as it is today.

These entering classes reflect the pressures for admission to all colleges in the years since World War II. The present relative decline in pressure is a result of several factors. The

low birth rate of the depression years has resulted in fewer students of college age than we shall have soon. The defense forces are competing for the services of a relatively small generation. High wages in industry and active industrial recruiting programs draw young men and women from the same reduced pool.

This situation will change soon. Today's College enrollments must be considered low. Our present students were born in the nineteen thirties when the birth rate was about 18 per thousand. In 1952 it was 25 per thousand. Families are having nearly 40% more children than in the nineteen thirties, and there are many more families. The increase in number of births that started about 1940 is still very much in evidence. The "wave" has not receded. In 1952 there were more than 3,900,000 births in the United States—the largest number in one year in the history of the country.

These children are now crowding the elementary schools. Elementary schools in the United States enrolled 26,000,000 pupils in 1952. The number will more than double in five years. High school enrollments are still largely unaffected by this increase, but the pressure will reach them in about two years. The high school enrollments are certain to rise sharply until about 1962. That high level of high school attendance will be carried along until 1970 at least.

A slow rise is evident in college attendance which has nothing to do with the increased birth rate. In 1940 college graduates were 4.6% of the population 25 years old or older. In 1952 they were 6%. The per cent of high school graduates that goes on to college is rising. This is partly a result of a rise in incomes. But more important are the greatly increased opportunities in the professions. The increasing demand for technically trained men and women is as widespread as the natural ambitions of young Americans.

Admiration for people who can do things well is an outstanding characteristic of the American people. The Armed Forces in World War II reinforced the American belief that a college education greatly increases the ability of an individual to go on to high accomplishment. College graduates

in the Army, Navy, Air Force and Marine Corps moved rapidly to positions of power and responsibility. The thousands of soldiers and sailors sent back to college to learn more in order to be more useful will not soon be forgotten.

Then, after the War, governmental assistance to veterans enabled many thousands to secure college educations who had never thought of college as a possibility. Large numbers came from families who had never sent a boy or girl to college. These veterans are now graduated and are settling into successful careers. All this is not lost on the younger brothers and sisters. They, too, are determined somehow to go to college.

This tremendous confidence of the American people in the value of a college education, and the great sacrifices parents often make to keep their children in college, throw a new responsibility on those who guide and direct our institutions of higher education. Somehow we must meet this challenge.

The present slow rise in pressure for admission to college will be stepped up sharply in about five or six years when the boys and girls born in the early 1940's reach college age. The number of eighteen year olds will increase to a high plateau in about 1965. The boys and girls are already born to maintain this high level for at least several years. Increasing base population will guarantee a continuing large number of children even if the birth rate declines.

It has been estimated that either college attendance must be increased by 50% by 1965 or that college must be denied to thousands of able and ambitious boys and girls. Whether or not this goal can be met fully is doubtful. Whatever is done in that direction, however, must bring a certain re-orientation to higher education in this country. Many private colleges are not interested in growing larger. Others cannot expand much because of the endowment situation in an inflationary period. This will throw a disproportionate part of the load on the tax-supported colleges and universities.

This situation is always in our minds as we look to the years ahead. We are trying to develop fast enough to keep

pace with the demand for admissions. We hope we shall not fall so far behind as we were in 1946 when a sharp increase in demand by veterans required us to establish a branch at Fort Devens to accommodate several thousand students while we built more facilities at Amherst.

We cannot well build ahead of demand but we are making every effort to grow with the demand and to approach the end of the decade with a well-rounded staff and with a plant that is reasonably free from the seriously congested places that still plague us.

The Faculty

The great strength of the University lies in its faculty. Few of those who have never been closely associated with college or university staffs realize the wholehearted devotion to their work that characterizes these men and women.

There are many problems closely related to teaching and research that can be solved best by the teachers and research workers who are closest to the situations involved. This means the assignment of many faculty members to committee work for varying periods. The ability which is focused on these problems, combined with the industry and enthusiasm with which the work is done, is most heartening. Administration of the University would be most difficult without the full cooperation of the faculty.

Retirements continue to remove some of our most experienced staff members. At the beginning of the year, Basil B. Wood retired as librarian after 27 years of devoted and unselfish labor in the interest of the University. In February 1952 Edwin F. Gaskill retired after 27 years as head of Station Service. On August 31, Dr. Walter S. Eisenmenger, head of the Department of Agronomy, retired after 25 years on the agricultural staff. Also on August 31, Dr. Henry J. Franklin retired as head of the Cranberry Experiment Station at Wareham after 44 years of service. Again, on August 31, Guy V. Glatfelter retired from the Placement Office after 30 years in agricultural and placement work.

On January 31, William L. Machmer retired after 42 years. For more than a quarter of a century he had been Dean of the University. He had more to do with the direction of development of this University than any other man in his period of service.

We have lost through retirement more than 30 key men and women in the past 10 years. This has made a change in the University, for the University is the combined shadows of all those who are actively interested in it—the administration, the faculty, the trustees, and a host of friends who are in positions to make their influence felt.

No man is ever replaced in fact. We get a good man to fill the position and then inevitably change directions just a little in line with the new situation. We hope we can retain the best that has been developed by these older men and we look ahead with confidence in an institution that has such tremendous vitality and wonderful potentialities for the years ahead.

Students

This is the second year in which we have admitted more than one thousand freshmen. We selected them from more than 3000 applicants. Two years more will fill the four classes at this level and bring the classes into balance for the first time since the large classes of veterans were graduated.

Our enrollment this year is 3223 in the four-year undergraduate college, 274 in the Graduate School, and 294 in the two-year Stockbridge School of Agriculture—a total of 3791 students. An additional 435 registered in the Summer School. This total enrollment reflects an increase over the previous year of 175 students.

The curriculum for the first two years is much the same for all students, but in the junior and senior years the undergraduates concentrate on some field of major interest. Nearly half our four-year students have a major interest in Arts and Sciences, followed in order by Engineering, Business Administration, Agriculture and Horticulture, Home Economics, and Physical Education for Men.

The enrollment of women was severely limited in the earlier post-war years to make room for large numbers of veterans. The number of women students has now been increased to meet more adequately the needs of qualified young women of the state. The ratio in freshman classes is approximately four women to six men. This is about the proportion in which well-qualified candidates present themselves for admission. This year's total of 1173 women is double the enrollment of women of six years ago.

Most women students have a major interest in Arts and Sciences. Home Economics has the highest enrollment of women students among the professional fields. Women are enrolled, however, in every curriculum of the University, except the Military Division and Physical Education for Men.

Counselling for women is well organized and effective. Academic counselling by faculty advisers is supplemented by informal personal counselling in the dormitories under the guidance of resident housemothers and trained student leaders. Experience in dormitory living is an integral part of the educational and social environment of women students.

There are 336 veterans still on the campus. Half of them are aided by Public Laws 16 and 346, the Veterans Education Laws of World War II. Other veterans have exhausted their benefits and are proceeding on their own resources.

In the fall of 1952 the new law, Public Law 550, became effective. Sixty-seven veterans are enrolled under the new law. It is expected that the number of veterans of Korea will increase sharply in the autumn of 1953.

Housing and Health

Two dormitories for men were used this year by women students. We are fortunate in having certain dormitories so located that they can be used for either men or women. It gives a much needed flexibility to housing arrangements.

To free these dormitories for the use of women students it was necessary to place an extra man in each room in the

County Circle dormitories and in some of the rooms in freshman dormitories. This very unsatisfactory crowding will be relieved by the completion of the two dormitories now under construction.

All but six apartments of the temporary housing for veterans provided in 1946 were torn down this year. This housing no longer provided safe quarters. The six remaining units are occupied by student families too large to fit into our apartment dormitories. We still have 65 units available for married students. Our two apartment dormitories are so constructed that they may readily be returned to regular dormitory use, but we shall probably continue for some time to need the apartments for student families.

The Student Health Service meets the needs of students in several ways. It reviews the records of physical examinations done by home doctors before the student enters the University, notes those in need of special attention, and screens out those unable to take basic military training or physical education. It gives physical examinations to all candidates for varsity teams. It provides treatment for all ambulatory cases of student illness in the out-patient clinic from Monday through Friday. It provides bed care in the Infirmary for minor illnesses and injuries. It provides medical advice in the offices of the University Physicians, and it refers serious or complicated cases to specialists or hospitals as indicated.

Testing and Counselling Service

For some years we have administered classification tests to freshmen to provide measures of the range of scholastic aptitudes of individual students. To increase the value of these tests in counselling students, research is underway to determine their accuracy and to establish local norms.

Psychological tests of interests, aptitudes, intelligence and personality are available to any students who feel that such information would be of value. When academic failures result from ineffective reading and study habits, the student may be given help toward improvement either individually or as a member of a small group.

Financial Aid to Students

Most of the men and women students who attend the University work in summer to help defray their expenses. Many of them have part-time employment during the college year. They work in offices and dining halls, help do the janitor work and the farm work, and work in the town in private homes or for business firms.

The hours of employment vary from an occasional hour to more time than any student should take from his academic program. Last year nearly 700 students earned \$85,630 on the campus during the academic year.

Many able and deserving students, however, are unable to meet college expenses without loans or scholarships. This year 513 students received \$80,900 in scholarship aid. One hundred scholarships of \$250 each provided by the Commonwealth have eased the way for many students in desperate need of assistance. Most of our other scholarships are in Agriculture. They are needed in Agriculture but we do need also many more scholarships available to students in Arts and Sciences, Engineering, Business Administration, Home Economics and other fields.

The interest in scholarships of local organizations in every corner of the state is most encouraging. Many Granges, Service Clubs, and other groups provide scholarships for local young men and women. Often it is this kind of help that makes a college education possible for some ambitious student.

Religious Activities

Religious activities of students at the University are under the direction of three Chaplains assigned to the campus by organizations of Protestant, Catholic and Jewish faiths. In addition to the general student organizations, the Student Christian Association, the Newman Club, and the Hillel Foundation, there are denominational groups by which the student is drawn into the fellowship of the local churches of Amherst.

The Hillel Foundation offers special programs for the Holy Days in addition to the regular club meetings. The Newman Club sponsors a three-day retreat in the spring semester. Under the auspices of the Council of the Protestant Chaplain all the denominational clubs join with the Student Christian Association and dormitory representatives in conducting Christmas Vespers, weekly communion services in Lent and a Religious Convocation Day in spring.

Non-credit courses in religion are offered by the three faiths, and the Chaplains are available at regular hours for individual conferences with students.

The Schools

The School of Liberal Arts, under Dean Frank Prentice Rand, serves all Schools in the field of general education and in addition continues to engage the major or professional interest of more students than any other School by a wide margin. It has at present 934 major students. Significant among developments in Liberal Arts is the implementing of a program in the Department of Education leading to the training of teachers for Elementary Education. This recognizes an urgent need for more and more teachers in the public schools and also an insistent demand from a substantial number of our students who look forward to careers in teaching.

Courses are being developed which point to majors in Journalism and in Speech. Both are of particular interest to the fields of radio and television. Major courses in Recreational Leadership in the department of Education, represent a broadening in the scope of another important professional field of interest.

The rapid growth of this School has resulted in serious crowding which will soon become crippling in its intensity unless it can be relieved. The building program for the immediate future proposes a classroom building for liberal arts.

With 642 major students the School of Science, under Dean Walter S. Ritchie, ranks second in School enrollment.

A live and active staff interest in research is of first importance to science departments. It not only produces

tangible results in the way of new information but keeps the staff abreast of the rapid developments in its field and enlivens the whole teaching process. Research is increasing throughout the science departments. The principal deterrent is heavy teaching schedules, almost every department being overcrowded with students.

Despite this situation, more than 80 research papers were published by staff members of this school during the past year. Several substantial grants for research have been received by science departments during the year. A cancer research project of the Zoology Department is supported by the American Cancer Society. Investigations of a chemical nature are supported by the Office of Naval Research, The Research Corporation and Army Ordnance. Research in Entomology has had substantial support through the Pest Control Operators research fund. Many other grants of funds from outside the University are doing much to keep research programs active; for example, one honor student of the class of 1951, has just completed a successful year at the Zoological Station in Naples, Italy.

The rapid increase in enrollments in Science has led to such overcrowding that it is interfering with teaching, especially in the Departments of Bacteriology and Public Health, Chemistry, Botany, Zoology, Geology, Mathematics and Entomology. New buildings proposed for the immediate future will bring relief.

School of Engineering

The School of Engineering, under Dean George A. Marston, has 476 students this year. Engineering is now enrolling about 15% of the freshmen who enter the University. There is every indication that the enrollment will increase steadily.

Although this School is only in its sixth year, it has made notable progress in building a competent staff and a satisfactory curriculum. Its dean reports that all its graduates

in the past year were in demand by industry and defense plants, and that recruiters find our graduates compare favorably with those from older engineering schools.

Funds were provided this past year for the completion of the main engineering building. This will not only give us splendid quarters for Engineering, but the added classrooms will ease demands on classroom space in other areas. A new steam engineering laboratory was started in the Engineering Annex. The Engineering library is being built up as rapidly as funds permit and has reached 2500 volumes, most of them recent publications.

Engineering is a profession, and engineering teachers think of themselves as engineers as well as teachers. A high professional morale exists in this School. All of its faculty members have been active in professional and industrial organizations or in publishing. For example, during the past year one of the staff members brought out a textbook on basic engineering metallurgy that has been widely adopted for use in college teaching. Other staff members have served as consultants to the Massachusetts Civilian Defense organization, and still others have engaged in research and consultant work for private industry.

Many of the smaller industries in our state cannot maintain technical research staffs, and a large percentage of the technical problems of such industries could be solved if brought to the attention of staff members in our engineering school. Because the opportunity for this type of service to Massachusetts industry is so large, plans are being made for a full-time director and a full-time engineering extension professor in our Engineering Research Institute.

Business Administration

The School of Business Administration, with 413 students, has grown 75% in the past four years. The staff, under Dean Milo Kimball, has been strengthened by new appointments in the past year and the curriculum has been improved by the rearrangement of several courses.

A course in Administrative Accounting and Control has been added. Business Law has been extended to cover a full year. The traditional course in Money and Banking has been replaced by a survey of all financial institutions. A new course in Insurance was offered last year for the first time. It is interesting to note that an increasing number of young women are enrolled in the curriculum in Merchandising.

Agriculture and Horticulture

As I have pointed out in previous reports, the School of Agriculture and Horticulture has a somewhat different relationship to the Commonwealth than the other Schools. This is an industrial state, yet agricultural production is of importance in many ways. Food costs, for example, would be higher if it were not for the substantial amounts of milk, fruit, eggs, poultry and other food supplied by the intensive agriculture which prevails here. The School of Agriculture must continue to be the source of technical information, leadership and service for the agricultural industry.

Reorganization of our agricultural services, under Dean Dale H. Sieling, has been underway for some time and is proceeding very well. Coordination of teaching, research and extension work has been greatly improved. In the past year all farm help, farm machinery equipment, transportation and farm land have been brought together in a common pool. This will provide a flexibility in the use of all our resources in this field which should result in their more efficient use.

Plans are also underway to marshal all our professional resources in Agriculture and Horticulture and apply them to all the fields of teaching, research and extension to bring about a closer coordination and increased effectiveness.

The School of Agriculture and Horticulture has enrolled this year 378 four-year undergraduates, 294 in the two-year Stockbridge School, and 74 graduate students. This is nearly one-fifth of our total enrollment.

In the past year the University was chosen by the Mutual Security Agency as the principal institution for the training of two groups of foreign agriculturists who were brought to

the United States under the Mutual Security and Point IV programs. The first program was a three-weeks fruits and vegetable session attended by 23 Europeans. The second was a two-weeks session on pastures attended by 41 experts in grasslands management from Europe. Both groups were very enthusiastic about these institutes.

The Stockbridge School program in Food Management is being reorganized. It has the firm support and assistance of the Hotel Managers and Stewards Association. An excellent program in city and site planning has been developed in the Department of Landscape Architecture, and a special summer program composed of intensive courses in Forestry and Engineering is new for forestry students.

The Agricultural Extension Service continues to center its efforts on agriculture, homemaking and youth problems. An interesting recent development in extension work is the inclusion of urban and suburban residents who previously had little or no part in Extension programs. Much of the information disseminated by the Extension Service is of interest to suburbanites in particular, and the programs are now directed to all the people.

The Extension Service has conducted a half-hour television show each week as a joint project of state and county organizations.

We have had a substantial number of important contributions by Agricultural Research in the past year. For example, a new tomato immune to leaf mold has been developed. Fundamental studies on vinegar manufacture indicate that more effective means are available for the making of vinegar and the effective utilization of surplus low grade apples.

Agricultural control services tested a million and a quarter birds for pullorum, several thousand for infectious bronchitis, and have done much diagnostic work on other diseases. The Shade Tree Laboratories cultured 8000 Dutch Elm disease samples for diagnostic purposes.

The School of Home Economics, like the School of Agriculture, includes three services: resident teaching, extension

and research. In the past year a continuing effort has been made to coordinate activities of these services more closely under the Dean of the School, Dr. Helen S. Mitchell.

The past six years have been marked by a steady growth in enrollment in Home Economics from 111 students to 293 this past semester. The research staff has completed five years of nutritional studies conducted cooperatively in the Northeastern Land Grant Colleges, and results are now being prepared for publication.

The Division of Physical Education, under Professor Warren P. McGuirk, is organized in three departments: Athletics, Physical Education for Men, and Physical Education for Women.

Five hundred and seventeen students played on varsity athletic teams in the past year. The sports represented were football, basketball, soccer, winter track, spring track, swimming, pistol, baseball, golf, tennis, lacrosse and skiing.

With a goal of "Athletics for Everyone", interest in intramural athletics has increased to a marked extent in the past two years. We have now reached the limit of physical facilities and of personnel for supervision. About half of the men students took part in these programs. In touch football, 24 teams played 276 games; in basketball, 34 teams played 561 games; and in softball, 28 teams played 373 games. It is probable that participation can be increased 50% when we can develop the necessary facilities. This development is in the planning stage.

A revision of the curriculum for professional training in Physical Education is now in effect. The course provides for a strong supporting minor in an academic subject, a broader opportunity for teaching certification, and a more comprehensive professional program.

Each woman student in the freshman and sophomore year is required to take part in one individual sport, one team sport, some type of dancing, and to pass a safety test in swimming. Also required are courses in life saving, water safety and basketball officiating. These courses are popular

with women students who are interested in camp counselling during the summer or in teaching in secondary schools.

All extra-curricular sports and dancing for women students are organized and directed by the Women's Athletic Association Council, composed of 16 students and the women's physical education staff. Practice games and tournaments are scheduled in archery, badminton, basketball, bowling, field hockey, softball, swimming, tennis and volleyball. Two well-organized clubs develop synchronized swimming and modern dancing. Swimming shows have attracted much interest. Invitation games with other colleges involve more than a hundred girls each year.

We need very much to improve the facilities in this field. A new building for Physical Education for Women is next on our building program.

Our Graduate School, under Dean Gilbert L. Woodside, has been carefully reorganized and the new program of graduate work has been adopted gradually in the past year. We believe that this new program will materially strengthen all phases of our graduate work.

Great and continuing development of the sciences has brought into the universities so much information pertinent to professional work that it is hardly possible today to graduate competent professional men and women in four years of undergraduate science instruction. Some of the intensive specialization required in some professional undergraduate programs must be passed on to graduate schools.

This situation will certainly result in the expansion of graduate education. Since a graduate program is an active stimulant to a department, we should like to see the graduate program extended gradually into every department that is staffed to handle graduate work well.

Building Needs

Among the capital outlay items approved by this Board of Trustees for the fiscal year beginning July 1, 1953, are three buildings of major importance.

The first is a physical education building for women. With more than 1200 women students we have a larger enrollment of women than many women's colleges. Facilities for physical education for women consist of quarters in what is known as the Old Drill Hall. This is a wooden building constructed in 1883. It was abandoned 22 years ago by the department of Physical Education for Men as no longer suitable for physical education purposes, and turned over to women at a time when there were few women on the campus. Facilities are meager, antiquated and wholly unsuited to present-day needs.

We have more than twice as many women now as we had men undergraduates 22 years ago. In this past year we have accommodated women enrolled in the required physical education classes by such make-shift arrangements as holding classes in dormitories.

Because it will take a year to draw plans for this building we are asking the Legislature for funds for preparing plans so that an accurate cost figure may be submitted later with a request for an appropriation for construction. This project has the approval of the Public Building Commission.

The second major item is an addition to Goessmann Laboratory, the chemistry building. This laboratory and classroom building was built in 1924 to accommodate 750 students. Today there are 1346 student enrollments in chemistry courses. We have come to the point where some students who wish to take chemistry courses must be turned away.

Moreover our Department of Chemical Engineering is housed in temporary, crowded and unsuitable space in the Engineering Annex building. The proposed addition to the chemistry building would provide for the needs of the Chemistry department and also suitable quarters for chemical engineering. Chemistry and chemical engineering would then share laboratory, storage, library and classroom space. This addition to the chemistry building has been approved by the Public Building Commission and funds have been made available for developing plans.

The third building in the present budget is a classroom building for Arts and Sciences. We have 1576 students with a major interest in Arts and Sciences. Every other student spends most of the first two years in the college. Classes in the humanities and social sciences are held all over the campus wherever a classroom is available for an hour.

Two buildings, in particular, that are used continuously by this college should be replaced. The 58-year-old wooden mathematics building was condemned a year ago by the Department of Public Safety as a fire and life hazard. The temporary wooden war-surplus building known as the Liberal Arts Annex is also a fire hazard. Both should be replaced by a safer and more suitable building as soon as possible. We have asked for funds to prepare plans for an Arts and Sciences classroom building.

Another project foremost in the building program is the renovation of the old dining hall into a classroom and laboratory building for the School of Business Administration. This project has the approval of the Public Building Commission. It is supplying funds to plan the necessary alterations.

In concluding my report last year I pointed out that our troubles are mostly growing pains. Some of these are a result of the inevitably uneven growth during the emergency development period immediately following World War II. In this period of gradual growth of the next few years we hope that some of these growing pains will be eased as we fill in areas that had to be neglected.

In general, the University today is in a healthy condition. It is steadily increasing its effectiveness as an educational institution, and will continue to move nearer to fulfilling the State University's obligations to the people of the Commonwealth.

RALPH A. VAN METER

President

February 12, 1953

UNIVERSITY OF MASSACHUSETTS ENROLLMENT

OCTOBER 1952

UNDERGRADUATE COLLEGE

Class.....	1953		1954		1955		1956		Total		Total
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	
Liberal Arts	92	79	76	123	85	168	127	184	380	554	934
Science	82	35	105	47	97	65	108	103	392	250	642
Engineering	65	1	67	0	129	1	212	1	473	3	476
Bus. Adminis.	65	9	80	5	127	12	108	7	380	33	413
Agric. & Hort.	63	9	101	8	94	4	89	10	347	31	378
Home Econ.	0	51	0	58	0	82	0	102	0	293	293
Phys. Ed. for Men	13	0	11	0	11	0	25	0	60	0	60
Specials									16	11	27
	380	184	440	241	543	332	669	407	2048	1175	3223

GRADUATE SCHOOL

Men	Women	Total
240	34	274

STOCKBRIDGE SCHOOL

Class	1953	1954	Total
Men	110	177	287
Women	1	6	7
			294

SUMMER SCHOOL

Men	Women	Total
319	116	435

SUMMARY OCTOBER 1952

Undergraduate College.....	3223
Graduate School.....	274
Stockbridge School	294
Total Enrollment.....	3791

(Office of Publications, October 1952)

THE UNIVERSITY OF MASSACHUSETTS BULLETIN



*1953 Summer Session Catalogue
Amherst, Massachusetts*

SIX WEEK SUMMER
SESSION • JUNE 30 - AUG. 11

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 University
 LaDoyt K. Teubner, Director of Audio-Visual Aids for the Public Schools,
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 Helen S. Mitchell, Dean, School of Home Economics
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UNIVERSITY OF MASSACHUSETTS

SUMMER SESSION

1953

Regular Six-week Term — June 30-August 11

Short term for Driver Education — June 22-July 3

The University of Massachusetts will conduct a regular six-week summer session and a special two-week session in 1953. Opportunity for study in many basic courses and special fields will be offered. The program will give special attention to teachers, school administrators, veterans, and community leaders as well as undergraduate students.

In cooperation with the Center for Safety Education of New York University, a special two-week *Driver Education Instructor* course will be offered. This course is intended to prepare teachers seeking certification to teach Driver Education in secondary schools. Qualified persons may pursue this offering for graduate or undergraduate credit.

DEGREE CREDIT

All courses offered carry degree credit. They are organized on a one-semester basis, and are equivalent in method, content and credit to courses offered in the University during the regular academic year. Credits obtained in these courses are ordinarily accepted as transfer credits by other colleges and universities. Students attending the Summer Session usually earn up to six semester-hour credits toward graduate or undergraduate degrees. In cases where special permission is granted additional credits may be earned. Students desiring to pursue courses for advanced degrees must seek the approval of the Dean of the Graduate School.

EXPENSES

1. Tuition for residents of Massachusetts (entire session)	\$20.00
2. Tuition for residents of Massachusetts (Special Course)	\$10.00
3. Tuition for non-resident undergraduate students (entire session)	\$80.00
4. Tuition for non-resident undergraduate students (Special Course)	\$40.00
5. Tuition for non-resident graduate students per semester credit hour	\$10.00
6. Student Health and Activities Fee	\$2.00
7. Room rent for six weeks at \$4.00 per week	\$24.00
8. Board for six weeks (Monday through Friday) at \$9.50 per week	\$57.00

Payment for Summer Session fees is due June 22 and must be paid at or before registration. No students will be eligible to attend classes until fees are paid.

LIVING ACCOMMODATIONS AND HEALTH SERVICE

Students, not commuting from home, are expected to live in the University Dormitories and board at the University Dining Halls.

The University Infirmary will be kept open during the session with a staff doctor on call.

ADVANCE ENROLLMENT; VETERANS AND CIVILIANS

In order to facilitate arrangements, students contemplating attendance should notify the Director of the Summer Session at once, using the application form on page 11.

Veterans who plan to enroll under the G.I. Bill must present at the time of registration evidence of eligibility (V. A. certificate of eligibility or, if previously enrolled, a clearance through the University Coordinator). Veterans failing to obtain certification must make payment of tuition and fees.

New students who are not under G.I. Bills must file certificate of residence with the Treasurer's Office.

RECREATION

Under the direction of a faculty-student committee, programs for recreation offering many informal sports such as swimming, soft ball, baseball, tennis and hiking will be arranged.

A limited number of special lectures and entertainments will also be provided. Dances and one major picnic will be scheduled by the Social Committee.

CALENDAR

June 30, Tuesday, 1:00-5:00 p.m. Registration, Drill Hall

July 1, Wednesday, 8:00 a.m. Classes begin

August 10, Monday - August 11, Tuesday, 12 M. Final Examinations

August 11, Tuesday, 12 M. End of Summer Session

LIST OF COURSES

- ACCOUNTING 25. INTRODUCTION TO ACCOUNTING.** The principles underlying the gathering, recording, and interpretation of accounting data. Credit, 3.
8-10:30 MTWTF, North College, 406. Mr. Colwell.
- BOTANY 1. INTRODUCTORY BOTANY.** The morphology and physiology of plants. Credit, 3.
1-1:50 MTWTF, Clark Hall, 104; 2-3:50 MTWT, Clark Hall, 202. Mr. Scarborough.
- CHEMISTRY 2. GENERAL CHEMISTRY.** A study of the fundamental chemical laws and theories. Credit, 3.
1-1:50 MTWTF, Goessmann, 28; 2-3:50 MTWT, Goessmann, 12. Mr. Richason.
- CHEMISTRY 81, 181. ADVANCED ORGANIC CHEMISTRY.** A rapid and intensive survey of the important reactions of organic chemistry. Credit, 3.
9:20-10:30 MTWTF, Goessmann, 28. Mr. Cannon.
Prerequisite, a year of organic chemistry.
- DAIRY 78, 178. ICE CREAM MAKING.** A study of the principles and practices of ice cream making with some time devoted to refrigeration, machinery, delivery equipment, and merchandising methods. Credit, 4.
8-11:50 MTWTF, Flint Laboratory. Mr. Nelson.
- ECONOMICS 25. ELEMENTS OF ECONOMICS.** Definitions and introductory principles of production, exchange, and the financial organization of society; the economics of distribution and the use of wealth and income. Credit, 3.
9:20-10:30 MTWTF, Goessmann, 26. Mr. Howard.
- ECONOMICS 225. APPLIED ECONOMICS.** An appraisal of such economic questions as the business cycle, taxation, banking, international trade reparations, economic planning, in the light of economic principles. Credit, 3.
10:40-11:50 MTWTF, Goessmann, 26. Mr. Howard.
- EDUCATION 60, 160. ELEMENTARY SCHOOL CURRICULUM.** Content and methodology with emphasis on the unit method and activity program. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 12A. Miss Kellogg.
- EDUCATION 64, 164. PRINCIPLES OF ELEMENTARY EDUCATION.** Aims, organization, program, and pupil population. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 12. Mr. Cosgrove.
- EDUCATION 66, 166. PREPARATION AND USE OF AUDIO-VISUAL AIDS.** A study of a variety of aids and how they may be used effectively in teaching. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 32. Mr. Teubner.
- EDUCATION 72, 172. VOCATIONAL EDUCATION IN AGRICULTURE.** A survey of vocational education and an introduction to teaching vocational agriculture at the secondary school level. Credit, 3.
8-11 MTWTF, July 1-21, Liberal Arts Annex, 30. Mr. Oliver.
- EDUCATION 75, 175. TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE.** The materials, methods, policies, and special requirements of Massachusetts for teaching agriculture and related subjects in high school and special county schools. Credit, 3.
1-4 MTWTF, July 1-21, Liberal Arts Annex, 30. Mr. Oliver.

- EDUCATION 88, 188. SECONDARY SCHOOL CURRICULUM. A consideration of learning material and activities and their organization, and the preparation of courses of study. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 32. Mr. Purvis.
- EDUCATION 208. THE TEACHER AND SCHOOL ADMINISTRATION. Problems in admission, promotion, personnel, discipline, extra-curricular activities, supervision, tenure, salary schedules, etc. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 27. Mr. Purvis.
- EDUCATION 259. TEACHING ELEMENTARY SCHOOL SCIENCE. Methods and materials and their place in the activity program. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 12. Mr. Cosgrove.
- EDUCATION 265. TECHNIQUE OF REMEDIAL READING. Methods and materials in diagnosis and remedial instruction. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 12A. Miss Kellogg.
Prerequisite, a year course in methods of teaching elementary reading.
- EDUCATION 267. AUDIO-VISUAL LABORATORY. Practical experience in setting up and using common Audio-Visual equipment and materials. Minor repairs and maintenance. Credit, 3.
10:40-11:50 MTWTF, South College Basement. Mr. Teubner.
Prerequisite, Education 66, 166, or a similar course.
- ENGLISH 2. ENGLISH COMPOSITION. Intended to teach straight thinking, sound structure, clear and correct expression. Credit, 2.
10:40-11:50 MTWTF, Old Chapel, D. Mr. Koehler.
- ENGLISH 25. HUMANE LETTERS. A general reading course based upon a chronological selection of masterpieces: classical, continental, and English. Credit, 3.
9:20-10:30 MTWTF, Old Chapel, D. Mr. Allen.
- ENGLISH 26. HUMANE LETTERS. A continuation of English 25, but may be elected independently. Credit, 3.
8-9:10 MTWTF, Old Chapel, A. Mr. Williams.
- ENGLISH 57, 157. ENGLISH LITERATURE OF THE RESTORATION. A study of the social problems and literary values of the Restoration period as they reflect in prose, verse, and drama. Credit, 3.
9:20-10:30 MTWTF, Old Chapel, B. Mr. Koehler.
- ENGLISH 68, 168. MODERN DRAMA. The development of English and American drama from the time of Ibsen to the present day. Credit, 3.
10:40-11:50 MTWTF, Old Chapel, B. Mr. Williams.
- ENGLISH 77, 177. THE MODERN NOVEL. An analytical presentation of eleven novels written between 1890 and 1930, in which the expanding form and the extension of critical themes will be stressed. Credit, 3.
8-9:10 MTWTF, Old Chapel, B. Mr. Allen.
- FOOD TECHNOLOGY 51. INTRODUCTORY COURSE. A general elementary course covering food economics, production, distribution and processing. Credit, 3.
1-5 TWT, Chenoweth Laboratory. Mr. Fellers.

- FOOD TECHNOLOGY 61, 161. INDUSTRIAL TECHNOLOGY.** A survey of commercial practices in the manufacture and preservation of food products. Credit, 3.
1-5 TWT, Chenoweth Laboratory. Mr. Levine.
Prerequisites, Food Technology 52, Food Products and Adjuncts; Bacteriology 31, Introductory.
- GEOLOGY 27. PHYSICAL GEOLOGY.** An introduction to the agents and processes that modify the earth's crust. Credit, 3.
8-10:30 MTWTF, Fernald Hall, K and B. Mr. Johansson.
- GERMAN 79. CONVERSATIONAL GERMAN.** Practice in the oral use of German, based on reading material prepared in advance. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 1. Mr. Goldsmith.
Prerequisite, Intermediate German.
- WORKSHOP IN GERMAN.** For graduate students. An intensive course designed to provide the student with the elements of German needed for acquiring a reading knowledge of the language. Study of the basic principles of grammar and sentence structure. Reading and translation of scientific and literary texts. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 1. Mr. Goldsmith.
- GOVERNMENT 25. AMERICAN GOVERNMENT.** A study of the principles, machinery, dynamics and problems of American national government. Credit, 3.
1-2:10 MTWTF, Goessmann, 26. Mr. Tinder.
- GOVERNMENT 72, 172. MODERN POLITICAL THOUGHT.** A study of the development of political thought and its relation to cultural and institutional growth from the rise of the modern state to the present. Credit, 3.
10:40-11:50 MTWTF, Old Chapel, A. Mr. Tinder.
- HISTORY 59, 159. HISTORY OF THE UNITED STATES.** A survey of the national development including political, social, economic, and cultural factors in the growth of American democracy up to 1865. Credit, 3.
10:40-11:50 MTWTF, Old Chapel, C. Mr. Cary.
- HISTORY 5. MODERN EUROPEAN CIVILIZATION.** The course covers the period from the later Middle Ages to 1815. Credit, 3.
8-9:10 MTWTF, Old Chapel, C. Mr. Cary.
- HOME ECONOMICS 77. HOME MANAGEMENT PRACTICE.** In the home management house, students assume the responsibilities involved in managing a home. Credit, 3.
Hours by arrangement. Miss Merriam.
- HOME ECONOMICS 81, 181. METHODS OF TEACHING HOME ECONOMICS.** This course gives credit toward meeting state standards for teachers. Credit, 3.
10:40-11:50 MTWTF, Skinner Hall, 217. Mrs. Piatt.
- HOME ECONOMICS 98, 198. SPECIAL PROBLEMS.** Weaving and other work with textiles, such as designing in stencils, batik, block printing, etc. Credit, 3.
9:20-10:30 MTWTF, Skinner Hall, 119. Miss Briggs.
- MARKETING 73. ADVERTISING.** The techniques and media of advertising, its services to business, and the organization and economic functions of the advertising industry. Credit, 3.
10:40-11:50 MTWTF, Goessmann, 28. Mr. Hardy.

- MATHEMATICS 6. INTRODUCTORY CALCULUS FOR ENGINEERS.** May be used as a substitute for Mathematics 29, Differential Calculus. Differentiation, with applications; technique of integration. Credit, 4.
9:20-11 MTWTF, Mathematics Building, B. Mr. Boutelle.
Prerequisites, Algebra, trigonometry, and plane analytic geometry.
- MATHEMATICS 7. ALGEBRA AND TRIGONOMETRY.** Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry. Credit, 3.
8-9:10 MTWTF, Mathematics Building, B. Mr. Boutelle.
- MUSIC 51. DISCOVERING MUSIC.** An elementary, non-technical course dealing with the elements of music, forms in music, musical compositions, and with selected composers. Credit, 3.
9:20-10:30 MTWTF, Memorial Building. Mr. Alviani.
- MUSIC 62. TEACHING MUSIC IN THE ELEMENTARY GRADES.** The principles of musical development are studied with particular emphasis on presentation in the classroom. Credit, 3.
10:40-11:50 MTWTF, Memorial Building. Mr. Contino.
- PHILOSOPHY 61. INTRODUCTION TO PHILOSOPHY.** A general approach to philosophy both from the standpoint of method and content; an attempt to understand and evaluate contemporary ideas. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 11A. Mr. Shute.
- PHILOSOPHY 64, 164. ETHICS.** The meaning of good and evil, right and wrong; a survey of ethical theories and practices and an attempt to evaluate these theories with reference to modern ethical problems. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 11A. Mr. Shute.
- PSYCHOLOGY 26. GENERAL PSYCHOLOGY.** An introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 27. Mr. Feldman.
- PSYCHOLOGY 94, 194. CHILD PSYCHOLOGY.** The course aims to develop an understanding of the behavior of the child. Psychological aspects of the following are considered: original nature, maturation, play, social behavior, personality and mental hygiene. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 27. Mr. Neet.
Prerequisite, Psychology 26, General Psychology.
- RECREATION EDUCATION 78, 178. SPECIAL PROBLEMS IN RECREATION AND OUTDOOR EDUCATION.** A qualified student may elect to undertake independent study of a selected problem in the area of his primary interest or specialization. Credit, 3.
Hours by arrangement. Mr. Grimshaw.
- SOCIOLOGY 28. INTRODUCTION TO SOCIOLOGY.** An outline study of the social order, and of the individual considered as a member of his various groups. Credit, 3.
8-9:10 MTWTF, Old Chapel, D. Mr. Driver.
- SOCIOLOGY 51, 151. URBAN SOCIOLOGY.** A comparative study of modern social conditions, and methods of adjustment, with special reference to city environment. Credit, 3.
8-9:10 MTWTF, Draper Hall, 2A. Mr. Manfredi.
Prerequisite, Sociology 28, Introduction to Sociology.

- SOCIOLOGY 53, 153. AN INTRODUCTORY STUDY OF CULTURAL ANTHROPOLOGY.** A non-technical sociological study of man in pre-literate societies. Credit, 3.
10:40-11:50 MTWTF, Draper Hall, 2A. Mr. Manfredi.
Prerequisite, Sociology 28, Introduction to Sociology.
- SOCIOLOGY 75, 175. SOCIAL PROBLEMS.** A study of abuses affecting the home, recreation, industry, family, welfare, public health, government, mental disease and crime. Credit, 3.
9:20-10:30 MTWTF, Draper Hall, 2A. Mr. Driver.
Prerequisite, Sociology 28, Introduction to Sociology.
- STATISTICS 79, 179. ELEMENTARY STATISTICS.** Methods of collecting, analyzing, interpreting, and presenting statistical data. Credit, 3.
1-3:15 MTWTF, North College, 411. Mr. Russell.

SPECIAL COURSES

- CHEMICAL ENGINEERING 56, 156. UNIT OPERATIONS I.** A study of the fundamental principles underlying the unit operations of fluid flow, heat transfer, evaporation, humidity and air conditioning, and drying. Credit, 3.
8-10:50 MTWTF, August 31-September 18, Engineering Annex, 4. Mr. Cashin.
Prerequisites, Chemistry 65, Physical Chemistry; Chemical Engineering 55, Calculations.
- CIVIL ENGINEERING 27. PLANE SURVEYING.** The basic principles of mensuration; use of tape, transit, and level; a brief consideration of route surveying. Credit, 3.
3 44-hour weeks: August 10-28; August 31 - September 18. Mr. Grow.
Engineering Building.
Prerequisite, Mathematics 5, Introductory Engineering Mathematics, or Mathematics 7, Algebra and Trigonometry.
- CIVIL ENGINEERING 28. PROPERTY AND TOPOGRAPHIC SURVEYING.** A transit and tape property survey requiring reference to Registry of Deeds records. Credit, 3.
3 44-hour weeks: June 8-26; June 29-July 17. Mr. Osgood.
Engineering Building.
Prerequisite, Civil Engineering 25, Surveying, or Civil Engineering 27, Plane Surveying.
- CIVIL ENGINEERING 30. ROUTE SURVEYING PRACTICE.** A preliminary survey for a short highway location and the preparation of maps and profile. Credit, 3.
3 44-hour weeks: June 8-26; June 29-July 17. Mr. Gabrys.
Engineering Building.
Prerequisite, Civil Engineering 25, or 27, Surveying.
- MECHANICAL ENGINEERING 23. SHOP.** Woodworking, pattern making, and welding; use of various machine and hand tools used in metal working. Credit, 3.
3 44-hour weeks: August 10-28; August 31-September 18. Mr. Costa.
Engineering Shop.
- MECHANICAL ENGINEERING 27. SHOP.** Woodworking and pattern making; welding. For mechanical engineering majors. Credit, 3.
3 44-hour weeks: June 8-26; June 29-July 17. Mr. Patterson.
Engineering Shop.

MECHANICAL ENGINEERING 28. MACHINE SHOP. The fundamental machine tools: lathe, planer, shaper, milling machine and drill press. Credit, 3.
3 44-hour weeks: June 8-26; June 29-July 17. Mr. Costa.
Engineering Shop.

FORESTRY 55, 155. THE ELEMENTS OF FOREST MENSURATION. Methods of determining the volume and value of the forest growing stock; type mapping; methods of predicting growth of trees and stands. Credit, 3.
3 44-hour weeks: June 8-26. Mr. Ganley, Mr. MacConnell.
Conservation Building.

FORESTRY 78, 178. HARVESTING OF FOREST PRODUCTS. Practice in the harvesting and preparation of direct forest products. Field trips to active forest properties and to visit pulpwood operations and manufacturing plants. Credit, 3.
3 44-hour weeks: June 29-July 17. Mr. Ganley, Mr. MacConnell.
Conservation Building.

PHYSICAL EDUCATION 86, 186. DRIVER EDUCATION AND DRIVER TRAINING. Objectives, scope, content, and problems of driver training; teaching materials; psycho-physical tests; motor vehicle construction, operation, and maintenance; advanced driving practices; administrative standards; practice teaching and behind-the-wheel instruction. Offered by the Department of Physical Education for Men in cooperation with the Center for Safety Education, New York University, and the Massachusetts Registry of Motor Vehicles. Credit, 2.
8-12 MTWTF, June 22 to July 3. Mr. Stack and Staff.

Bulletin

45

Bulletin

UNIVERSITY OF
MASSACHUSETTS



COMMENCEMENT

1953



MECHANICAL ENGINEERING 28. MACHINE SHOP. The fundamental machine tools: lathe, planer, shaper, milling machine and drill press. Credit, 3.
3 44-hour weeks: June 8-26; June 29-July 17. Mr. Costa.
Engineering Shop.

FORESTRY 55, 155. THE ELEMENTS OF FOREST MENSURATION. Methods of determining the volume and value of the forest growing stock; type mapping; methods of pred
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FORESTRY 78, 178.
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PROGRAM

FRIDAY, JUNE 5, 1953

8:00 p.m. Informal Class Reunions.
9:00 p.m. Senior Hop.

SATURDAY, JUNE 6, ALUMNI-CLASS DAY

10:00 a.m. Annual Meeting, Associate Alumni, Memorial Hall.
10:30 a.m. Semi-Annual Meeting, Board of Trustees, President's Office.
12:00 m. Alumni Chicken Barbecue, Drill Hall.
2:00 p.m. Alumni Parade to Ball Game.
2:30 p.m. Varsity Baseball Game with Amherst College, Alumni Field. Following Game—Half Hour Concert on Chime.
6:00 p.m. Fraternity and Class Reunions as arranged by organizations.
7:15 p.m. Senior Class Night Exercises, Goodell Library Lawn. (In case of rain, the Cage.)
9:00 p.m. Roister Doister Play, "The Silver Whistle", Bowker Auditorium.

SUNDAY, JUNE 7, COMMENCEMENT

8:45 a.m. Commissioning of Seniors as Second Lieutenants in Army and Air Force Reserve.
9:00 a.m. Academics and Varsity Club Breakfast Meetings, Draper Hall.
11:00 a.m. Baccalaureate Service, the Cage.
Speaker: The Reverend Father Fidelis Rice, C.P.
Passionist Monastery
West Springfield, Massachusetts
12:00 m. Fraternity and Class Reunions as arranged by organizations.
3:00 p.m. Academic Procession from Memorial Hall.
3:30 p.m. Graduation Exercises.
Speaker: David Morton, L.H.D.

Bulletin

CLASS REUNIONS

ALUMNI REGISTRATION HEADQUARTERS MEMORIAL HALL

- 1888 65th Reunion—Herbert C. Bliss, Home for Aged Men and Couples, Providence, R. I.; Albert I. Hayward, Topsfield, Mass.
- 1893 60th Reunion—John R. Perry, 700 Commonwealth Avenue, Newton Centre, Mass.
- 1894 Annual Reunion—Dr. S. Francis Howard, 58 Main Street, P. O. Box 94, Northfield, Vt.
- 1898 55th Reunion—Willis S. Fisher, R. F. D. 1, Wakefield, R. I.
- 1903 50th Reunion—Gerald D. Jones, Cowles Farm, North Amherst, Mass.
- 1908 45th Reunion—Roland H. Verbeck, South College, University
- 1911 Annual Reunion—Leonard M. Johnson, P. O. Box 583, Danbury, Conn.
- 1913 40th Reunion—James W. Dayton, Munson Hall; Harold M. Gore, Phys. Ed. Building; Clark L. Thayer, French Hall, University
- 1916 Annual Reunion—Conrad H. Lieber, Spring Lane, East Pembroke, Mass.
- 1918 35th Reunion—Robert D. Hawley, 10 Pleasant Court, Amherst.
- 1923 30th Reunion—Dr. Luther B. Arrington, N. J. Agric. Exp. Station, New Brunswick, N. J.
- 1928 25th Reunion—Elizabeth Morey Kay, 50 Grand Street, Reading, Mass.; Dean John F. Quinn, University of Rhode Island, Kingston, R. I.
- 1933 20th Reunion—Benton P. Cummings, Roosevelt Road, Westport, Conn.
- 1938 15th Reunion—Herbert E. Brown, c/o Time, Inc., Rockefeller Center, New York 20, N. Y.
- 1943 10th Reunion—Robert A. Fitzpatrick, Stockbridge Hall, University



MECHANICAL ENGINEERING 28. MACHINE SHOP. The fundamental machine tools: lathe, planer, shaper, milling machine and drill press. Credit, 3.
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CLASS REUNIONS

(Continued)

- 1948 5th Reunion—Warren P. Gingras, The Liggett Drug Co.,
71 W. 23rd Street, New York City.
1950 3rd Reunion—Robert Leavitt, 242 E. High Street, Avon,
Mass.
1952 1st Reunion—Raymond D. Holmes, 387 Grove Street, Fall
River, Mass.

ALUMNI REUNION PROGRAM

SATURDAY, JUNE 6

- 10:00 a.m. Annual Meeting of the Associate Alumni, Auditorium, Memorial Hall.
12:00 Noon Alumni Chicken Barbecue, Drill Hall.
2:00 p.m. Alumni Parade, Memorial Hall to Alumni Field.
2:30 p.m. Varsity Baseball Game—with Amherst College—
Alumni Field. Following the game there will
be a half-hour concert on the college chime.
6:00 p.m. Class and fraternity reunions and suppers as
arranged by the various organizations.
9:00 p.m. Roister Doister Play—"The Silver Whistle," Bowker
Auditorium.

VOL. XLV

MAY, 1953

NUMBER 5

PUBLISHED FIVE TIMES A YEAR BY THE UNIVERSITY OF MASSACHUSETTS, JANUARY, FEBRUARY, APRIL (Two), MAY.

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George J. Cronin, State Purchasing Agent.

Bulletin

**UNIVERSITY OF
MASSACHUSETTS**

**STOCKBRIDGE SCHOOL
OF AGRICULTURE
1954-1956**



"No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought as agriculture. I know nothing so pleasant to the mind as the discovery of anything that is at once new and valuable—nothing that so lightens and sweetens toil as the hopeful pursuit of such discovery. And how vast and how varied a field is agriculture for such discovery. The mind, already trained to thought in the country school or higher school, cannot fail to find there an exhaustless source of enjoyment. Every blade of grass is a study; and to produce two where there was but one is both a profit and a pleasure. And not grass alone; but soils, seeds, and seasons; hedges, ditches and fences; draining, droughts, and irrigation; plowing, hoeing and harrowing; reaping, mowing and threshing; saving crops, pests of crops, diseases of crops, and what will prevent or cure them; implements, utensils, and machines, their relative merits, and to improve them; hogs, horses, and cattle; sheep, goats, and poultry; trees, shrubs, fruits, plants, and flowers; the thousand things of which these are specimens—each a world of study within itself."

ABRAHAM LINCOLN

*From address at Wisconsin State Fair,
Milwaukee, Wisconsin, September 30, 1859.*

Note: President Abraham Lincoln signed the bill known as the Morrill Act, sponsored by Senator Justin Morrill of Vermont, in 1862, in the midst of the great Civil War. This law established agricultural colleges in every state of the country under federal aid.

Massachusetts accepted the provisions of this Act in 1863, indicating that "the leading object of the College shall be to teach subjects relating to agriculture and the mechanic arts so as to promote liberal and practical education."

Thus was born our modern system of agricultural education which is contributing so greatly to the health and welfare of this nation and of the world.

Bulletin

UNIVERSITY OF MASSACHUSETTS

Stockbridge School of Agriculture 1954-1956



The University of Massachusetts is both a State University and a Land Grant College and as such has been established by Acts of Congress and of the Legislature of Massachusetts.

The two year course in practical agriculture at The University of Massachusetts is known as The Stockbridge School of Agriculture, named after an early president of the University. Included herein are descriptions of the various courses offered, information concerning expenses, enrolment, regulations, etc. In the back of catalogue will be found forms for application and certificate of citizenship.

The University reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

UNIVERSITY BULLETIN
Amherst, Massachusetts

VOLUME XLVI

JANUARY, 1954

NUMBER 1

Published five times a year by the University of Massachusetts, January, February, April (two), May.

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FOREWORD

Modern living demands modern agriculture. Each year the increasing population of our country requires more and more food and fiber to maintain a high standard of living. During the past century a remarkable change has taken place to bring agriculture from an art to an industry based on science and technology. This change has brought a higher standard of living to both the farmer and the consumer, and has actually resulted in a substantial numerical as well as percentage decrease in the persons engaged in farming. Now, only about 14 per cent of the population of the United States are farmers, whereas in 1853 approximately 60 per cent of the people lived on farms. The increased efficiency of agriculture has resulted in a better life for everyone. A greater quantity and higher quality of foods are now available to urban population at a proportionately lower relative cost than ever before—in 1853 about one-half of each industrial laborer's gross income was used to purchase food, whereas only one-fourth is required now for the same purpose.

The great accomplishments in agriculture are due to a continued and determined program of research, teaching, and extension in the agricultural colleges. These three activities complement each other. The discovery and application of new information has been the objective of the workers in these service fields.

The efficiency of agricultural production reflects the progress that has been made in discovering new and improved crops, in developing new breeds and strains of livestock and poultry, in improving disease and insect control for crops, and in promoting control measures that deal with animal health. Mechanization of farming operations has reduced labor costs of many farming enterprises, and sound farm management practices have made it possible for the average farm to produce an income from which the farmer is able to derive a standard of living comparable to that of urban people.

The two-year courses in practical agriculture have been designed to offer the student the greatest amount of important information within a short period of time so that, upon graduation, he may enter into employment with a background of *know how* that will insure his doing a commendable job in his chosen field.

DALE H. SIELING

*Dean of the School of Agriculture
and Horticulture*

CALENDAR

THE STOCKBRIDGE SCHOOL OF AGRICULTURE

1954

January 4, Monday, 8:00 A.M.	Classes Resume
January 29, Saturday, 12:00 M.	Classes Stop
February 1-3, Monday to Wednesday, 5:00 P.M.	Final Examinations
February 3, Wednesday, 5:00 P.M.	First Semester Ends
February 8, Monday, 8:00 A.M.	Second Semester Begins
February 22, Monday	Holiday, Washington's Birthday
March 6, Saturday, 12:00 M.	Second Semester Ends for Poultry Majors
March 8, Monday	Placement begins for Poultry Majors
March 20-29, Saturday, 12:00 M. to Monday, 8:00 A.M.	Spring Recess
March 29, Monday, 8:00 A.M.	Classes Resume
April 3, Saturday, 12:00 M.	Second Semester ends for all courses except Food Management and Forestry
April 5, Monday	Placement begins for all majors except Food Management and Forestry
April 15-20, Thursday, 5:00 P.M. to Tuesday, 8:00 A.M.	Holiday Recess
May 22, Saturday, 12:00 M.	Classes Stop
May 24-27, Monday to Thursday	Final Examinations
May 28-30, Friday to Sunday	Commencement

1954-1955

September 27, Monday	Freshman Registration
September 28, Tuesday	Senior Registration
September 29, Wednesday, 8:00 A.M.	First Semester begins for all students
September 29, Wednesday, 11:00 A.M.	Opening Convocation
October 12, Tuesday	Holiday, Columbus Day
November 11, Thursday	Holiday, Armistice Day
November 24-29, Wednesday, 12:00 M. to Monday, 8:00 A.M.	Thanksgiving Recess
December 18-January 3, Saturday, 12:00 M. to Monday, 8:00 A.M.	Christmas Recess
January 3, Monday, 8:00 A.M.	Classes Resume
January 29, Saturday, 12:00 M.	Classes Stop
January 31-February 2, Monday to Wednesday, 5:00 P.M.	Final Examinations
January 3-February 2, Monday to Wednesday, 5:00 P.M.	Final Examinations
February 2, Wednesday, 5:00 P.M.	First Semester Ends
February 7, Monday, 8:00 A.M.	Second Semester begins
February 22, Tuesday	Holiday, Washington's Birthday
March 5, Saturday, 12:00 M.	Second Semester ends for Poultry Majors
March 7, Monday	Placement begins for Poultry Students
April 2, Saturday, 12:00 M.	Second Semester ends for all courses except Food Management and Forestry
April 4, Monday	Placement begins for all majors except Food Management and Forestry
April 2-11, Saturday, 12 M. to Monday, 8:00 A.M.	Spring Recess
April 11, Monday, 8:00 A.M.	Classes Resume
April 19, Tuesday	Holiday, Patriots' Day
May 21, Saturday, 12:00 M.	Classes Stop
May 23-26, Monday to Thursday	Final Examinations
May 27-29, Friday to Sunday	Commencement

1955-1956

September 26, Monday	Freshman Registration
September 27, Tuesday	Senior Registration
September 28, Wednesday, 8:00 A.M.	First Semester begins for all students
September 28, Wednesday, 11:00 A.M.	Opening Convocation
October 12, Wednesday	Holiday, Columbus Day
November 11, Friday	Holiday, Armistice Day
November 23-28, Wednesday, 12:00 M. to Monday, 8:00 A.M.	Thanksgiving Recess
December 17-January 3, Saturday, 12:00 M. to Tuesday, 8:00 A.M.	Christmas Recess
January 3, Tuesday, 8:00 A.M.	Classes Resume
January 28, Saturday, 12:00 M.	Classes Stop
January 30-February 1, Monday to Wednesday, 5:00 P.M.	Final Examinations
February 1, Wednesday, 5:00 P.M.	First Semester Ends
February 6, Monday, 8:00 A.M.	Second Semester Begins
February 22, Wednesday	Holiday, Washington's Birthday
March 2, Saturday, 12:00 M.	Second Semester ends for Poultry Majors
March 4, Monday	Placement begins for Poultry Students
March 29, Saturday, 12:00 M.	Second Semester ends for all courses except Food Management and Forestry
March 31, Monday	Placement begins for all majors except Food Management and Forestry
March 24-April 2, Saturday, 12:00 M. to Monday, 8:00 A.M.	Spring Recess
April 2, Monday, 8:00 A.M.	Classes Resume
April 19, Thursday	Holiday, Patriots' Day
May 19, Saturday, 12:00 M.	Classes Stop
May 21-24, Monday to Thursday	Final Examinations
May 25-27, Friday to Sunday	Commencement

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Instructor in Bacteriology	
JOHN M. ZAK, M.S.	Stockbridge Hall
Instructor in Agronomy	



MEMORIAL HALL

*Erected in memory of the "Loyal Sons of Old Massachusetts"
who died in World War I.*

"We Will Keep Faith With You Who Lie Asleep"

(inscription on east facade)

THE STOCKBRIDGE SCHOOL OF AGRICULTURE

The Stockbridge School of Agriculture is the vocational non-degree department of the University providing training of post high school grade in the School of Agriculture and Horticulture.

Eleven programs of study are offered, one of which must be selected by each student and completed as specified for the school diploma. The present list of offerings includes:

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|---|---------------|
| 1. Animal Husbandry | (see page 24) |
| 2. Dairy Industry | (see page 28) |
| 3. Poultry Husbandry | (see page 33) |
| 4. Arboriculture | (see page 37) |
| 5. Commercial Vegetable Growing | (see page 40) |
| 6. Floriculture | (see page 43) |
| 7. Food Management | (see page 47) |
| 8. Forestry | (see page 53) |
| 9. Fruit Growing | (see page 58) |
| 10. Ornamental Horticulture | (see page 62) |
| 11. Turf Maintenance | (see page 65) |

Since its organization in 1918 at the request of the Massachusetts Legislature the school has registered more than 3,000 students and graduated thirty-one classes. The value of this kind of concentrated technical schooling aiming directly toward preparation for a definite field of work, is amply demonstrated by the successful careers of our graduates.

It is estimated about fifteen hundred farms change ownership each year in Massachusetts due to death, infirmity of age, disabling accident, or, in some few cases, just plain inefficient management. Farms will always need to have reliable sources of skilled workers and owner-manager replacements if New England crop production is to be successfully maintained on an adequate scale. This is both a challenge and an opportunity to young men and women.

General Information

Entrance Conditions:—The school program is open to any student who is seventeen years old or over and who has completed a secondary school course or its equivalent, but some major courses do require personal interviews with applicants to insure proper qualifications. All eleven programs of study have limited enrolment quotas which cannot be exceeded because placement, employment, or teaching facilities will not permit a larger student registration. There are no formal entrance examinations.

How to Enroll.—Fill out application blank, Form 1, page 76, giving all information requested. Be sure to indicate course you wish to elect. Mail this form, with citizenship certificate, Form II, on same page, to Director of Short Courses. If application is accepted you will be notified, and certificate of citizenship will be kept on file until you register.

Registration.—For registration dates see calendar in front of catalog.

Instruction.—Instruction is given by the University teaching staff through classroom teaching, laboratory exercises and practical work. The work of the classroom is supplemented by demonstration work in the barns, dairy plant, greenhouses, orchards, gardens, engineering shops, quick freezing plant, canning plant, forest, and abattoir. The courses are planned to offer fundamental information, and to establish the underlying reasons as well as the special methods employed in the various operations. The combined advantages of university instruction and a university plant with all its varied resources are thus made

available to young men and women training for successful business careers in agricultural vocations.

The usual University holidays are indicated on calendar, Page 4. First year Arboriculture students report two weeks prior to the opening of regular class work for preliminary training in the use of ropes and climbing. Freshman Poultry students complete only one month of the second semester to March first because earlier placement is required by poultry farmers. Other freshman classes continue to April first, when most students are assigned to placement jobs, excepting Food Management and Forestry freshmen who complete two full semesters to June first. Class work is required at the University in the months of October to March inclusive; placement training for practical experience on jobs away from the University, on a wage basis, is required of all first year students from April to September inclusive, with exceptions noted.

Diploma Requirements.—In order to obtain a diploma a student must complete satisfactorily the entire program of study in which he has registered. A student who fails to pass the requirements of his summer placement training, after a suitable job has been assigned him, is not eligible for graduation until this deficiency is made up, and may not be allowed to enroll for the second year, if the Director of Placement Service considers his record to be unsatisfactory.

Transfer Credits.—Graduation from the Stockbridge School of Agriculture does not fulfill the requirements for entrance in the University degree course, nor are credits earned during the course transferable regularly toward credit for a degree at this University.

Students who make excellent scholastic and placement records in this two-year course, and whose high school preparation has been satisfactory, may transfer to the same major program in the University with credit allowances of one to two semesters, depending on the individual record. This arrangement is limited strictly to students who meet the stipulated requirements, and each case is considered individually by the Registrar.

Evaluation of Stockbridge School Credits.—A student who has completed the work of the Stockbridge School may be recommended for transfer to the four year course if he has an average of 80 or above for his Stockbridge School course.

A student who has completed all the Stockbridge School work with an average of 80 or above shall be granted 30 credits in the four year course.

A student who has completed two semesters of the Stockbridge School course shall be granted 10 credits.

A student who has completed one semester of Stockbridge School work shall be granted 5 credits.

A student who has completed three semesters of work in the Stockbridge School should complete his course before transferring to the four year course.

A Stockbridge School student who has satisfactorily completed his period of placement training will have satisfied this requirement of a department in a four year major if this major is closely related to his Stockbridge School major. Otherwise, the Head of the Department will determine whether placement training for the four year course is to be required.

Graduation Requirements.—No student will be graduated unless all bills due the University are paid on or before the Wednesday preceding graduation exercises.

Diplomas and letters of honorable dismissal will be withheld from all students who have not paid bills due the University, or legitimate bills due private individuals or business concerns.

A diploma will not be awarded to any senior if arrears are reported by his fraternity. All bills for second semester, senior year, must be settled not later than the Wednesday before graduation.

Attendance at graduation exercises is required of all seniors before diploma will be awarded.

Seniors who have borrowed from the Goldthwait Loan Fund will have diplomas held as collateral by the University until they have paid up loans in full. This in no way interferes with the privileges of graduation.

Scholarship Regulations.—At the close of each semester students receive a formal report showing the standings given in the subjects pursued by them.

If a student's class average in any subject is below 50, he is failed (F) in the course without final examination privilege and must repeat course with the following class.

If the average of the class grade and the final examination is between 50 and 60, the student is thereby conditioned (#) and must repeat examination to receive a passing grade.

Students will be graded by instructors at mid-semester to show general standing and at end of semester for permanent record. The Faculty Advisory Committee will consider all questionable grades after each marking period, and when a student's scholastic record indicates failures or uniformly poor work, may recommend close supervision of his class work by the major department concerned, or that he be asked to withdraw from School.

A first year student will not be eligible for placement training if his scholastic average in his major courses at the end of the first semester in February is between 60% and 70%. However, he will be eligible for placement if he attains the required grade of 70% or better in his second semester major courses or, if he is recommended for placement with a lower grade by his major department.

At the end of any semester a student who is failed in two courses or has conditions in more than two courses may be dismissed.

Rules and Regulations

Absences from Class

- (1) **No unexcused absences will be allowed from classes. Absences from classes immediately before or after a holiday will be subject to special disciplinary action and may lead to suspension from School.**
- (2) **An excuse card covering each class absence shall be secured at Short Course Office within two days after student returns to classes and, if approved, is submitted to instructors concerned for their signature.**
- (3) **Two tardinesses unexcused shall count as one absence.**
- (4) **All students are required to report promptly to University infirmary, if ill, and condition permits. Bring doctor's statement for absence excuse if treated elsewhere.**
- (5) **Students failing to observe these rules are placed on probation and by faculty action may be asked to withdraw from School if further violations occur.**
- (6) **Instructors may reduce final grades five points for each unexcused absence occurring on a student's record at the end of any semester.**

Absences from Examinations or Tests

Any student who absents himself from an appointed examination without sufficient cause shall be given zero thereon. In such case he shall not be entitled to a make-up examination unless the Director so requests.

Student Expenses

Tuition.—A tuition fee of \$50 per semester is charged students, residents of Massachusetts, enrolled in the Stockbridge School of Agriculture. Students who are not residents of Massachusetts are charged a tuition of

\$200 each semester. The tuition per semester, charged persons not citizens of the United States is \$200. **Students entering from Massachusetts, unless of voting age themselves, are required to file a statement signed by either town or city clerk, stating that the applicant's parent is a legal resident of Massachusetts.** (See Form II in back of catalog.)

Variation in Charges for Three Major Courses

Food Management Course.—Placement jobs in the Food Management Course are not available until after June 1, and students have to complete two semesters of resident study each year.

Poultry Husbandry Course.—Because of earlier placement required on poultry farms, students complete only one and one-quarter semesters of class work here the first year.

Forestry Course.—Two full semesters work the first year followed by four months placement training.

Summary of Expenses Estimated:

	FIRST YEAR		FIRST YEAR (Hotel & Forestry Majors)	SECOND YEAR	FIRST AND SECOND YEARS
	First Semester	Second Semester	Second Semester		Field Trips
Tuition (Citizens of Mass.)	\$ 50.00	\$ 25.00	\$ 50.00	\$100.00	\$15.00-52.00
(Poultry Majors)		12.50			
Board (University Commons) . .	165.00	82.50	165.00	330.00	(Fees listed under major Programs)
(Poultry Majors)		41.25			
Room Rent (Private Homes—Freshmen)	80.00	40.00	80.00		
(Poultry Majors)		20.00			
Room Rent (Dormitory—Seniors) . .	—	—	—	165.00	
*Student Fees (Itemized below) . .	19.75	13.25	19.00	40.75	
Books, stationery, etc.	45.00	45.00	45.00	90.00	
	<u>\$359.75</u>	<u>\$205.75</u>	<u>\$359.00</u>	<u>\$725.75</u>	<u>\$15.00-52.00</u>
Poultry Majors		132.00			

These figures for board and room are estimates based on prevailing prices and are subject to change when, and if conditions change.

*Student Fees:

	FIRST YEAR		FIRST YEAR (Hotel & Forestry Majors)		SECOND YEAR	
	First Semester	Second Semester	First Semester	Second Semester	First Semester	Second Semester
Athletics	\$10.00	\$5.00	\$10.00	\$10.00	\$10.00	\$10.00
Class Tax	1.00	1.00	1.00	1.00	1.00	1.00
Collegian	1.50	.75	1.50	1.50	1.50	1.50
Concert Fee	1.50	1.50	1.50	1.50	1.50	1.50
Shorthorn (School Yearbook) . .	3.00	4.00	3.00	4.00	5.00	5.00
Stockbridge School Activities . .	2.00	1.00	2.00	1.00	1.00	1.00
Student Handbook	.75	—	.75	—	.75	—
	<u>\$19.75</u>	<u>\$13.25</u>	<u>\$19.75</u>	<u>\$19.00</u>	<u>\$20.75</u>	<u>\$20.00</u>

Advance Payment

New students will be expected to make an advance payment of \$15 to the Treasurer of the University as soon as they are notified by the Director that they are accepted for admission. This will be considered as first payment on registration fees which will be due at time of matriculation in the fall. It is not refundable and will be considered as payment for admissions and registration expense if the student does not matriculate.

Refund of Student Payments

Prepaid tuition and fees will be refunded to students withdrawing as follows:

- | | |
|---|-----|
| a. Within the first two weeks from the date of registration | 80% |
| b. Within the third week | 60% |
| c. Within the fourth week | 40% |
| d. Within the fifth week | 20% |
| e. After fifth week, no refund. | |

Prepaid board—pro rata refund.

Prepaid room rent—no refund.

When Payments Are Due

In accordance with policy established by the Board of Trustees, all charges for tuition, fees, board and room rent in University dormitories are due at the beginning of each semester and must be paid on or before the opening date of each semester. Bills will be rendered in advance by the University Treasurer and payment may best be made by mail. Students may not attend classes until registration charges are paid.

Late Registration

Any student who does not complete his registration, including payment of semester charges on the regular registration days will be required to pay a fine of five dollars.

Rooms

First year students are required to make their own arrangements for rooming facilities and may secure a list of available rooms from the University Housing Office. Each first year student is urged to inspect his own rooming quarters before making an agreement with a home owner. The University assumes no responsibility for inspection or approval of rooms in private homes, and these homes will vary greatly with regard to conveniences, number of students in each house, and distance from the campus.

Dormitory rooms may be available for Stockbridge senior men students. During the freshman year, some men may be invited to join one of the two Stockbridge School fraternities. These fraternity members may be given permission to live in the fraternity house during the senior year; all other second year men may be required to live in University dormitories in so far as accommodations are available except those who live at home and commute to the campus. Those who cannot be so housed will be given permission to live in private homes.

Room rents for one year in college dormitories vary from \$130.00 to \$165.00.

Women Students: Women students of the Stockbridge School are housed in University dormitories and have their meals at the University Commons unless given permission to commute from home. Room rent is approximately \$124 for Freshmen, \$165 for Seniors. Board is approximately \$225 for Freshmen, \$340 for Seniors for a five-day week.

Under the supervision of the Dean of Women, life in each dormitory is directed by a council of student leaders, advised by a full-time Housemother, so that conditions in the residence hall are conducive to study and good living habits. Through Women's branch of the Student Government, the responsibility is put upon each student to live according to her own best standards as well as according to the standards of the group.

Room furnishings include mattress and pillow; students furnish bedding, linen, towels, desk lamp and wastebasket. Rooms are cared for by students occupying them.

Dormitories are open at 1:00 o'clock on Sunday preceding Stockbridge registration.

Board

Stockbridge freshmen are not required to secure meals in the University Commons, but can do so if it is more convenient.

A number of public restaurants or dining rooms are located close to the University where most students arrange for meal service, usually approximating \$2.00 a day, with allowances made if student goes home on weekends, class schedule permitting.

A new student should sample the various places to find one suited to his needs, where he can meet with congenial members of his class group.

All students residing in University dormitories will be required to board in the University Commons.

Books and Supplies

For the convenience of students, the University maintains a store service in North College. Here all textbooks may be purchased at cost plus transportation charges. Students are informed at the first class session in each course what books are required and must secure individual copies according to order list sent in by instructor.

There is little opportunity to secure secondhand books because most students find the texts assigned of value to retain as reference sources after completing a course.

Student Aid

Students desiring financial aid from the University in the form of part-time employment, are required to file applications with the Student Aid Committee not later than June 10 of each year. Incoming freshmen are allowed an extension of time.

These application forms are used to determine the comparative need of the applicants and are passed on by the Student Aid Committee. No student is eligible for any kind of financial assistance from the University unless he or she has filed the required form and has been certified as deserving by the Student Aid Committee. Application forms may be secured at the Placement Service Office, South College.

The placement training period between the first and second year usually enables a student to earn from \$500 to \$1,000 depending upon his skill and general ability, and the type of work. This will pay a large part of the second year expenses.

Prospective students should understand that the above estimates cover expenses which may be called strictly University expenses, and that there are other financial obligations voluntarily assumed by students which they should expect to meet. Such expenses vary from \$28 to \$36 a year. Additional financial responsibility is also assumed by students joining fraternities or entering into other social activities of the University. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$600 and \$700 for the first year for one and one-half semesters in residence, and \$800 to \$900 for the second year of two semesters.

Student Employment Projects

Part-time work is available for a limited number of needy students. The type of work to which students may be assigned is as follows: clerical and office, building and grounds maintenance, farm, greenhouse and orchard duties, helpers in livestock and cattle barns, and other miscellaneous jobs.

Self Help.—The University does not encourage students to enter without money in the expectation of earning their way entirely. The student will find it better to work and accumulate sufficient funds before coming to the University, or else to take more than two years in completing his course.

No student should undertake work that interferes with his studies, and students should understand that no one may receive any large amount of work at the University.

First year students particularly should not risk failure in their beginning studies by taking on such extra work until they have, at least, tested themselves in the study program of the first semester. It is advised to proceed cautiously in combining both extra work and athletics at the same time, if the student's scholastic record is at all questionable.

Loans

The Vincent Goldthwait Loan Fund.—This fund was established by Dr. Joel E. Goldthwait, U. of M. 1885, of Boston, as a memorial to his son who died in 1922 during his junior year at Harvard. Its purpose is to aid worthy senior students who find it difficult to secure adequate finances to complete their final year. Only seniors needing a supplement to funds already available will be considered. Amounts in excess of \$200.00 are rarely granted and most loans range from \$50 to \$150.00.

A regular promissory note must be executed, endorsed by parent or guardian, and repayment may be made within any reasonable period after graduation up to one year. There is no interest charge.

Stockbridge Emergency Loan Fund.—This fund was started by the Class of 1951 and added to by the Classes of 1952 and 1953 as their commencement gifts to the School. It provides immediate loans for short periods of time, one week to one month usually, to any student who finds his funds running short or has an emergency expense not anticipated. These are temporary loans without interest charge to meet emergency situations only, developing during the school year.

All requests for such aid should be made in person to the Director of Short Courses who issues the necessary order to the Treasurer's Office.

SCHOLARSHIPS

Ascension Farm School Scholarships.—(For Western Massachusetts Only)

Trust funds from the Ascension Farm School Corporation of Great Barrington were given to the University trustees in 1952 the income from which shall be used to provide for the "education and training in agriculture of boys resident in Western Massachusetts," as stated in its original charter. This makes possible the award of scholarships to men students residing in Hampden, Hampshire, Franklin, and Berkshire counties, with special consideration to be given applicants from the last named county. Ten freshman and four senior awards were made for 1953-54 in amounts from \$100 to \$200.

First year students needing such aid should write for application forms and submit them to the Short Course Office by August 15. Seniors should secure application forms before leaving for placement training and file by same date.

Lotta Crabtree Scholarships.—By special arrangement with the Lotta Crabtree Foundation trustees of Boston, a limited number of scholarships are now available to Stockbridge students. Eleven senior and ten freshman scholarships were granted by the Faculty Scholarship Committee for 1953-54 in amounts of \$75.00 to \$100.00.

Applications may be secured from the Short Course Office and filed here before August 15 of each year. Senior applications should be secured before starting placement in the spring.

Wilbur H. H. Ward Scholarships.—The Wilbur H. H. Ward Fund is administered by a Board of Trustees independent of the University. Applicants for these scholarships should write to Sumner R. Parker, who may be addressed

at 1 Sunset Court, Amherst, Mass. They are available only to Hampshire County boys.

General Exercises

Assembly exercises are held weekly on Wednesdays, 11:00-12:00 M., and serve to bring together all Stockbridge students for a general program dealing with matters of interest to the University and the School. Among speakers who appear from time to time are the President of the University, members of the University Staff and others who have interesting subject matter to present. This weekly assembly also enables announcements concerning students and student affairs to be presented, and permits class presidents to make advance reservations for business meetings when necessary. **No unexcused absences from this exercise are allowed.**

STUDENT ACTIVITIES

A large number of student organizations furnish opportunity to students for work and leadership.

Memorial Hall is the center of student activities and contains offices for the various student organizations, including the Stockbridge School Student Council. On the first floor are located a lounging room, the Memorial Room, and the offices; in the basement, bowling alleys, pool and ping pong tables; and on the second floor an auditorium for meetings and dances. This building was erected by the alumni, students, faculty, and friends in honor of the fifty-one "Aggie" men who gave their lives in World War I.

For those students who play musical instruments there are opportunities with the University Orchestra and the University Band.

Student Council.—The Stockbridge School Council is composed of representatives of the first and second year classes. This body serves as a general committee on student government and helps to maintain the best traditions and customs of the school.

Shorthorn.—A student yearbook called "The Shorthorn" is published annually by the members of the graduating class, and is usually issued in June. All students subscribe to it.

Fraternities.—There are two Stockbridge fraternities for men in the student body. Alpha Tau Gamma and Kappa Kappa, both owning houses, serving as social and residential centers for their groups.

Scholastic Society

A Stockbridge Honorary Scholastic Society called "Stosag" was established in 1935 to encourage high scholarship. Students whose records show no grade below 70 in any subject and whose average for the first three semesters is 85 or better, are elected to membership in the society each June. Engraved certificates are awarded to members of the graduating class who have achieved this distinction.

Athletics and Physical Education.—The school has its own separate athletic program with regular schedules in football, basketball, ice hockey, cross-country and winter track. Sweaters and letters are awarded to team members and managers in these sports. The official insignia is the letter S.

The football team plays a schedule of 6-7 games with preparatory school teams. The basketball team plays a 12 game schedule; the cross-country team usually runs 3 races while 2 or 3 meets are scheduled for the winter track squad. Ice hockey affords 6 to 8 games depending on the weather.

Due to the fact that most freshmen are on placement training by April first, which leaves only seniors available, no regular team is maintained in baseball. Men desiring to play soft ball are organized into teams and an intramural league is arranged.

This athletic program is entirely under the supervision and direction of the Athletic Department of the University and coaches are provided for all sports. Instructor Stephen R. Kosakowski, director of the Stockbridge physical education work, is coach of football, basketball, hockey, and has charge of the spring recreation program. Associate Professor Llewellyn L. Derby, coach of the varsity track team, has charge of the cross-country.

A physical education building containing a swimming pool, an indoor cage 150 by 180 feet for all kinds of sports and games, and locker room and shower bath facilities are provided. Individual equipment is supplied to all members of the football, hockey, basketball, cross-country, and track squads, and for students wanting general recreation. They may avail themselves of facilities in cage and swimming pool during scheduled hours in school year, when not assigned for other activities.

STUDENT RELATIONS

The customary high standard of university men in honor, manliness, self-respect, and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or persistent violation of rules must be reported by the instructor to the Director for discipline.

The privileges of the university may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the university, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined, but he may be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet if in the judgment of the university authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct.

HEALTH SERVICE

The Health Service is a separate administrative unit dealing with all matters directly or indirectly influencing or affecting the health of staff members, employees, students, or campus visitors.

The University endeavors to safeguard the health of all students while on the campus. Basic medical attention is provided, including preliminary diagnosis, primary treatment of injuries, and temporary care of the sick. A group of three infirmary buildings and a staff of resident physicians and resident nurses are available to perform these functions.

- (1) Physical examination by your local doctor is required of all entering freshmen and re-entering students. Physical report forms for this examination will be mailed to each student prior to October 1, and must be returned to the Short Course Office not later than that date.
- (2) The Student Health physicians have offices in the out-patient Infirmary Building, where they may be consulted during college hours.
- (3) The Infirmary consists of 3 buildings, one for bed patients, one for contagious cases, and one for out-patient cases, where the out-patient clinic is conducted daily by one of the Student Health physicians.
- (4) The students are urged to consult the resident physicians at the first sign of physical disorder, or even for minor accidents. Many severe illnesses and much lost time may be avoided by early or preventive treatment.

- (5) House calls cannot be made to dormitories, private homes, or fraternities except in the case of emergency. The University cannot assure each student that a resident physician will always be available. In such instances students are encouraged to consult a town physician, although any expense connected with such service shall be borne entirely by the student. One resident physician is on call at all times to care for emergencies beyond the scope of the nurse on duty.
- (6) No charge is made to Infirmary bed patients up to seven days in each school year; time in excess of seven days will be charged at the rate of \$4 per day. A nominal charge may be made to out-patients for miscellaneous treatments.
- (7) In addition to the fee charged as specified in paragraph 6, the following additional expenses will be charged to the patient.
 - (a) *Nurses*.—If a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.
 - (b) *Professional Service*.—If a student requires continuous medical attention by a physician, he may be required to select a town physician and become responsible for fees charged by that physician.
 - (c) *Supplies*.—Special medical supplies prescribed by a physician will be charged to the patient.
 - (d) *Laundry*.—Expenses for personal laundry incurred by students while in the infirmary will be charged to the individual student.
- (8) The Health Service recommends strongly that students participate in the blanket insurance program described in literature accompanying the initial bill rendered students each year. This program is a reimbursement insurance plan providing medical, surgical, and hospital care for both accidents and illnesses at a very low cost. During the past years this plan has saved numerous patients from serious unexpected expenses and the insurance payments have enabled the student to stay in school. The University has no financial interest in this and acts only as a clearing house to receive premiums, in order to give the low group rate.

GOODELL LIBRARY

This fine building completed in 1935 houses the University Library. This library contains one of the best collections in agriculture and related sciences in the country, with special strength in entomology, botany, chemistry, horticulture, landscape architecture, soil science and animal husbandry, but with large collections, also in literature, history, economics and sociology. There are over 151,000 bound books, and over 50,000 classified pamphlets giving most recent information. The periodical file contains over 800 current magazines, both scientific and popular, and a careful selection of periodical publications of learned societies. The Library is unusually rich in files of journals and publications of Experiment Stations. The Library is open from 7:45 A.M. until 10:00 P.M., Monday through Friday, and from 7:45 A.M. until 5:00 P.M., Saturdays. Sundays the Library is open from 1:45 to 4:45 P.M. and 7:00 to 10:00 P.M.

The building is named in memory of Henry Hill Goodell, President of the University from 1886 to 1904 and Librarian from 1886 to 1898.

AGRICULTURAL OPPORTUNITIES FOR WOMEN

Agriculture is a field in which women have always found some opportunity. There are women farming independently in all branches of agriculture. As a rule poultry raising, small fruits and vegetable growing and floriculture, seem to offer women an easier opportunity than dairy, stock, and general farming. There is little demand for women to fill paid positions on farms or estates. From time to time some positions are available such as the position of agricultural officer in state correctional institutions.

For the woman or girl whose home is already upon the farm the opportunity is better. With the help of an agricultural education there are open to her many means of increasing her own or the farm income. With the knowledge of farm life which she already possesses, and with the possibility of securing occasional help from her family, she may be able to carry on and develop a profitable enterprise of her own. The Stockbridge School of Agriculture offers to the women who wish to engage in farming the practical training which they will need to fit for such work.

Women who are interested in taking agricultural courses should correspond with Mrs. Carol Burr Cornish, Placement Officer for Women.

POSITIONS

The University does not guarantee positions to students registered in any of its courses, but through the Placement Service it has an opportunity to recommend students for a large number of positions. A record is kept of each student's work and experience, and of his success in positions for which he has been recommended after he has finished his course. Opportunities for trained men and women, especially those who have had experience, are good.

A student desiring a recommendation from the university must meet the following conditions:—

- (1) He must be of good character.
- (2) His previous record must be good.
- (3) His work in all courses must be satisfactory.

Students who have not previously had a considerable amount of practical experience cannot, as a rule, be recommended for positions of responsibility. This is especially true of the better positions for which managers or superintendents are wanted.

VOCATIONAL PLACEMENT

The work of locating first year students for apprentice training from April to October, after the resident term is completed, is in charge of the Director of Placement Service. Placement training for women students is in charge of Mrs. Carol Burr Cornish of the Placement Office. Every effort is made to secure satisfactory positions affording the kind of training desired by the student, but the Placement Office cannot guarantee to place every student for training, when positions are not available. In normal times placement positions are secured for all students who are eligible under these conditions.

1. Positions are secured that will enable a student to gain practical experience in his particular vocation.

2. A student desiring placement at home may arrange for such assignment if the Director of Placement approves. As a rule, it will be found more desirable for a student to spend this six months away from home even though he plans to be employed there after finishing the course. This statement is based on the experience of students who have already taken the course. The parent must request in writing, placement on the home project.

3. If credit is to be secured for the six months' placement training the following rules must be carefully observed.

Rules for Stockbridge Students on Placement

1. The student must interview the Director of Placement early in his first year in order that his qualifications, the type of work he wishes to pursue, and his general fitness may be determined.

2. No final arrangement for placement training may be made by the student himself until the Director of Placement has been consulted.

3. Students are required to complete their period of training without unnecessary absences.

4. No transfers are to be made by a student if he is to receive credit, until permission has been had from the Director of Placement.

5. A position may not be given up by the student until the Director of Placement has been notified.

6. A monthly report must be furnished on the form supplied, and submitted not later than the fifth of each month during his training period.

7. Students must satisfactorily complete all reports as required by the various departments.

8. When a student fails to complete the requirements of his placement training with a satisfactory grade, he is not allowed to take the work of the second year.

9. All students are given a thorough physical examination by the Department of Physical Education at the beginning of each university year. Any disabilities liable to affect the student's placement work are noted, and, if of a serious nature, recommendations for corrective measures are supplied. Parents should understand that most kinds of agricultural work require a well-balanced combination of brawn and brain. No student whose physical condition is questionable will be accepted for placement training without a physician's certificate, and parents' approval.

It should be clearly understood by both employer and employee that the same energy, regularity and general conduct will be expected of the student during his period of placement training as is expected in his work in classes and on the campus.

It should also be noted that this six months' experience is educational in its nature. Students are expected to earn and receive a reasonable wage, but the purpose of the training is the experience gained rather than the wage earned. The scale of wages may vary in different localities, but each man's ability is given very careful thought, that he may obtain a wage that is fair to him. In the event of any misunderstanding the supervisor should be immediately informed.

THE LOTTA AGRICULTURAL FUND FOR GRADUATES ENTERING AGRICULTURAL PURSUITS

(Prepared by the Lotta M. Crabtree University Committee with the approval
of the Trustees of the Lotta M. Crabtree Estate.)

A 1940 decision of the Probate Court of Suffolk County made available the Lotta M. Crabtree Agricultural Funds to graduates of the Stockbridge School of Agriculture, as well as to graduates of the four-year course at the University of Massachusetts. This decision does not, however, lessen the restrictions or change the purposes for which these funds can be used for farm financing.

The purpose of loans from these funds is to assist meritorious graduates who are without means in establishing themselves in agricultural pursuits. These loans are made without interest or service charges other than the cost of title search and legal papers. They must, however, be paid back in full amount within a reasonable length of time and there are certain restrictions on their use.

To avoid disappointment on the part of applicants and save unnecessary work and expense in investigating applications for loans, there are certain questions that the prospective borrower should answer for himself before making application for a Crabtree loan. The more important of these follow:

1. Am I thoroughly qualified, both in training and experience, to successfully manage the project that I am planning? Experience on a farm or in the agricultural enterprise contemplated, in addition to classroom training, is one of the first essentials for success. If such experience is lacking, it is usually best to delay application for a loan until acquired.

2. Is the project that I seek assistance in financing really an "agricultural pursuit"?

3. Am I using these funds entirely to establish myself in business or are they being used in part to benefit some other person who is not a graduate of the

University of Massachusetts or the Stockbridge School? This question sometimes arises in connection with "family" and "partnership" propositions. It has no reference to a wife or other dependent but no part of the loan can be used to finance a person who is not a University or Stockbridge graduate.

4. Am I using these funds for refinancing present debts? The purpose of these loans is to "establish" rather than "reestablish" persons in agricultural pursuits. They cannot be used for retiring present debts.

5. Will the amount that I can hope to borrow from these funds adequately finance the enterprise that I am planning to engage in? Lotta Agricultural loans are used mostly to supplement other forms of financing rather than for complete financing of farming operations. Reasonably definite plans for the other financing, which the loan is intended to supplement, should be worked out before applying for a Crabtree loan.

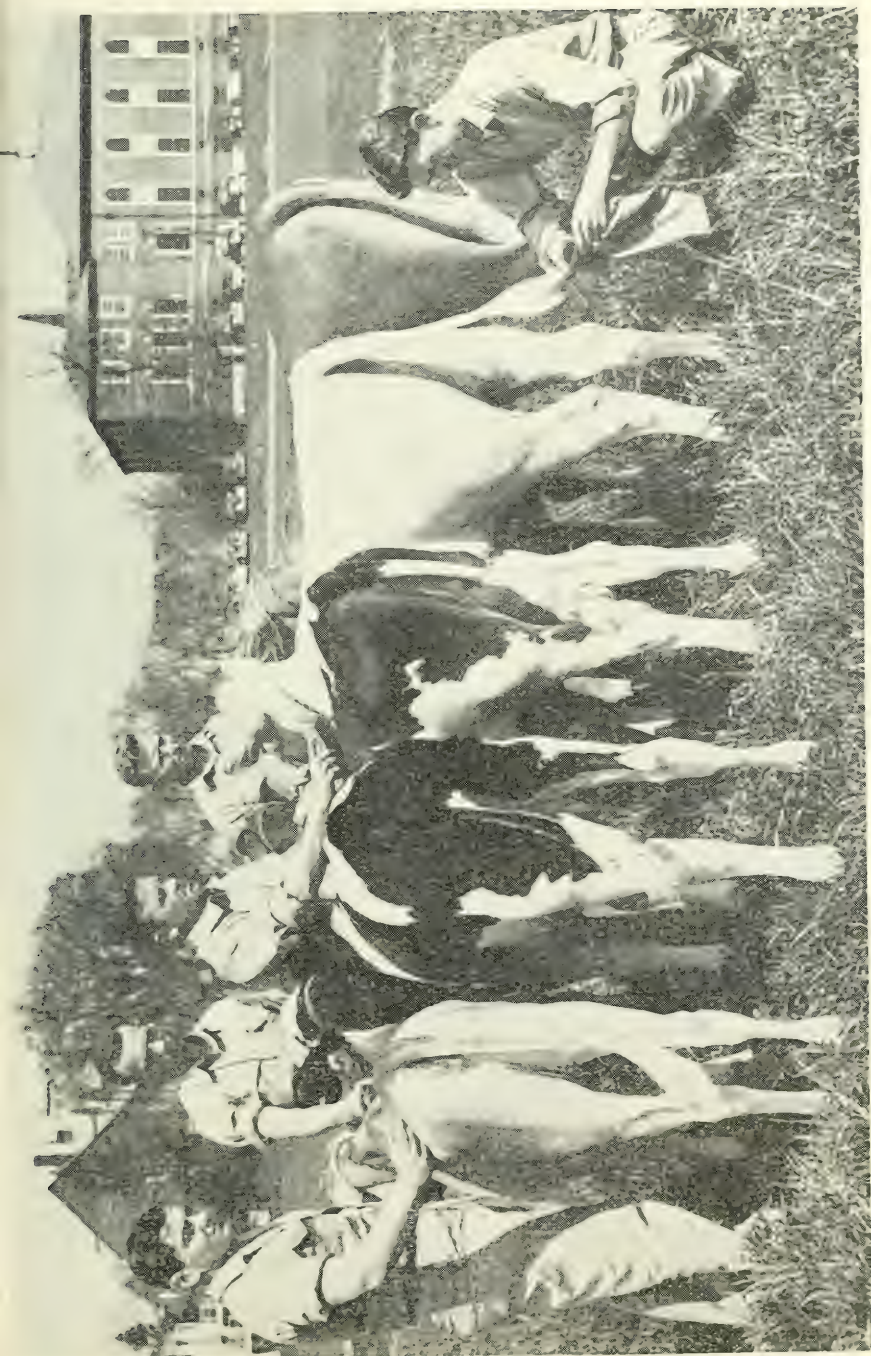
6. What can I offer as security to adequately safeguard this loan? A Crabtree loan, like any other loan, should be safeguarded against possible death or financial failure of the recipient. While character and personal integrity of the applicant are large factors in decisions relative to granting of a loan, adequate security should be provided as far as possible.

7. Can I amortize my debt payments and other financial obligations so that I can repay this loan within a reasonable period of time? Most Crabtree loans are made under definite agreement to repay within a relatively short period of years. The Crabtree applicant should therefore make certain, barring calamity, that his income above necessary operating and living expenses will be great enough to allow annual, semi-annual or monthly payments on this loan as well as on other debt obligations that he may be carrying.

8. Will this loan actually help me to make more money or will it merely delay the time and increase the burden of final financial reckoning? The answer to this question and also to No. 7 involves careful budgeting and planning ahead. Unless an applicant can show on paper by carefully projected plans and budgets of expected receipts and expenses that he will benefit by a loan, he is likely to have difficulty in repaying it.

Applications for the "Lotta Agricultural Fund" should be addressed to the Trustees of the Lotta M. Crabtree Estate, 619 Washington Street, Boston, Massachusetts, or may be secured at the Short Course Office or the Placement Office at the University. The Director of Placement has been designated as the Stockbridge representative on the faculty committee which makes approval recommendations to the Crabtree trustees. Decisions regarding the granting of a loan rest entirely with the Trustees under the terms of Miss Crabtree's will.

A successful farmer, according to the late Dr. G. F. Warren of Cornell University, must have what he called versatile ability. Agriculture, he pointed out, is a combination of science, art, and business. A good farmer must have knowledge, executive ability, and should be a good business man. He needs to be skilled with his hands in farm operations. The reasons for all his farm practices are based on scientific principles. He may learn to become a good farmer by imitation, in which case he applies scientific knowledge without knowing it. One who understands the principles involved will be able to adapt his practices to new and ever changing conditions. Such a man is resourceful and is our best hope in the future of agriculture.



A GROUP OF STOCKBRIDGE CONTESTANTS IN ANNUAL DAIRY CATTLE FITTING AND SHOWING CONTEST

ANIMAL HUSBANDRY

PROFESSOR RICE, PROFESSOR FOLEY, ASSOCIATE PROFESSOR HALE,
ASSISTANT PROFESSOR ELLIOT, MR. JAMES CHADWICK, MR. THOMAS PERLEY

Animal Husbandry, in this School, refers to the breeding, feeding and management of dairy cattle, beef cattle, horses, sheep and swine.

The purposes of the curriculum in Animal Husbandry are (1) to provide the student with a thorough understanding of the basic principles involved in the creation of more efficient and more beautiful animal types, said principles being those involved in the biology of animal reproduction, the chemistry of animal growth and nutrition and the economics of livestock production; (2) to show the practical workings of these principles in the selection, feeding and management of the various classes of livestock and (3) to provide practice in judging, fitting, showing and general management of livestock as well as the production of milk and other products, and the slaughtering, curing and marketing of meat products.

The University dairy herd comprises about 150 animals in the Ayrshire, Guernsey, Holstein and Jersey breeds. In beef cattle, we maintain a herd of Aberdeen-Angus and a herd of Herefords; in sheep, flocks of Southdowns and Shropshires; in swine, a herd of Chester Whites; and in horses, a stallion and several mares and foals in the Morgan breed. Modern barns house the above animals and modern equipment is available for practice work with them.

The University Farm of about 250 acres is handled primarily as a livestock farm, producing pasture, hays, silages and some grain for livestock feeding. The farm is equipped with up-to-date machinery for agricultural production. The farm and barns are our laboratories, the animals and accessories our equipment.

The Charles H. Hood Dairy Foundation Prize for Animal Husbandry Seniors

The Charles H. Hood Dairy Foundation Prize of \$200 is awarded annually to seniors who in the judgment of a faculty committee have made an outstanding scholastic record in this major course and who because of their practical qualifications, personality, and character, seem best qualified to receive this honor.

Trains for Jobs Like These:

Owners and operators of dairy farms; farm managers; superintendents or foremen; herdsmen in various kinds of livestock enterprises; dairy herd association testers; inseminators in artificial breeding units; businesses allied to agriculture such as farm cooperative fieldmen, sales and service men for feed, fertilizer and farm machinery companies.

Field trips will be required during the two years at an estimated cost of \$40 per student.

Special equipment needed for the course in Meats is: Knives, boots, and wash suits, at an estimated cost of \$15.

Animal Husbandry

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agricultural Economics S3 (Marketing)
Agronomy S1 (Soil Management)
Animal Husbandry S1 (Principles of Feeding)
Bacteriology S1 (Bacteriology and Rural Hygiene)
Dairy S1 (General Dairying)
Farm Management S3 (Efficiency in Farming Operations)
Milking (Practice periods only, by arrangement)

Elective

Physical Education S1 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agricultural Engineering S4 (Farm Shop)
Agronomy S2 (Fertilizers)
Animal Husbandry S2 (Types and Breeds)
Fruit Growing S10 (General Course)
Poultry Husbandry S10 (General Course)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S1 (Farm Power)
 Animal Husbandry S3 (Animal Breeding)
 Animal Husbandry S5 (Farm Meats)
 Business English S1
 Farm Management S1 (Farm Management and Accounts)
 Public Speaking S1
 Veterinary Science S1 (Animal Sanitary Science)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S10 (Farm Structures and Drainage)
 Agronomy S4 (Field Crops)
 Animal Husbandry S4 (Livestock Production)
 Animal Husbandry S6 (Dairy Cattle and Milk Production)
 Public Speaking S2
 Veterinary Science S2 (Applied Animal Sanitary Science)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

ANIMAL HUSBANDRY S-1. (Principles of Feeding) I.

This course includes a study of the organs of digestion, the digestion and absorption of feeds, the classification and characteristics of the common feed-stuffs, the utilization of feeds in maintenance, growth, fattening; meat, work and milk production. Some time will be spent on the importance of minerals and vitamins. Methods of calculating balanced rations; feeding standards, and feeding practices will be studied. A visit to a feed mill is a requirement of this course.

Textbook: Morrison, "Feeds and Feeding."

4 class hours and 1 2-hour laboratory period a week.

Credit 5.
 MR. CHADWICK.

ANIMAL HUSBANDRY S-2. (Types and Breeds) II.

This course considers the origin, history, development, characteristics and distribution of the breeds of cattle, sheep, swine and horses commercially important in the United States. The conditions to which each class of livestock and each breed seem best adapted will be discussed. Laboratory work consists of judging and evaluating as many rings of dairy, beef cattle, sheep, swine and horses as time permits.

3 class hours and 2 2-hour laboratory periods a week.

Credit, 5.
 MR. PERLEY.

ANIMAL HUSBANDRY S-3. (Animal Breeding) I.

This course is planned to acquaint the student with the facts of reproductive physiology, with the facts and theories of modern genetics, and to show how such knowledge may be utilized through genetic analyses, selection, and systems of breeding for the creation of more beautiful and more efficient animal types. A field trip is made to the Massachusetts Selective Breeding Association. Textbook: Rice and Andrew, "Breeding and Improvement of Farm Animals."

3 class hours and 2 2-hour laboratory periods a week.

Credit, 5.
 MR. ELLIOT.

ANIMAL HUSBANDRY S-4. (Livestock Production) II.

This course deals briefly with the problems of selection, breeding and care of horses, beef cattle, sheep, and swine, with emphasis on their place in New England Agriculture. Attention is given to the general situation, equipment, feeding, and management problems. The laboratory periods consist of practice in fitting and showing, shearing, docking and castrating. As a part of the laboratory work, each student will be assigned an animal for fitting and showing in the "Little International" which will be held on a Saturday in March. Trips to other purebred livestock establishments in New England will be required during the semester. The cost of transportation will not exceed \$5.00. Four students

in this course will be selected to participate in the New England two-year school judging contest. Textbook: Ensminger, "Animal Science."

Prerequisites: Animal Husbandry S1 and Animal Husbandry S2.

3 class hours, 1 2-hour and one 4-hour laboratory periods a week and trips.

Credit 5.

ASSOCIATE PROFESSOR HALE.

ANIMAL HUSBANDRY S-5. (Farm Meats) I.

This course includes a survey of the packing industry and follows the product (i.e., beef, pork, lamb and veal) from the feed-lot to the consumer's table. Practice is afforded in classifying animals as to market class and grade and in slaughtering, dressing, and cutting beef, pork, lamb and veal. At the end of the course, a trip will be taken to several large packing houses in Boston consuming one day and costing about \$10.00. Textbook: Ziegler, "The Meat We Eat."

Special equipment needed for this course includes knives, boots and wash suits, estimated cost \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. PERLEY.

ANIMAL HUSBANDRY S-6. (Dairy Cattle and Milk Production) II.

For Seniors.—This course treats all phases of dairy cattle production and management. The student is provided with an opportunity to study and seek the solution to the various economic, nutritional, genetic and managerial problems concerned in successful dairying. Lectures will be supplemented with talks by specialists in the various fields. Laboratory will consist of a detailed study of methods used on the university farm, with practice in the various skills necessary for the herdsman or showman. A dairy cattle judging team will represent the Stockbridge School of Agriculture in the New England two-year school judging contest. Special judging laboratories will be scheduled to train this team.

Trips to purebred livestock farms for the purpose of inspection and advanced dairy cattle judging will be required during the spring semester. The cost for transportation will not exceed \$15.00. Textbook: Petersen, "Dairy Science."

3 class hours and 2 2-hour laboratory periods a week, plus special judging practice and a two-day field trip.

Credit, 5.

PROFESSOR FOLEY, MR. CHADWICK.

ANIMAL HUSBANDRY S-8. (Food Management Meats) II.

For majors in the Food Management Course. This course is designed to impart a knowledge of the fundamental principles involved in judging, purchasing and efficiently utilizing meat and meat products. Laboratories will involve actual slaughtering, dressing, wholesale and retail cutting and preparation of by-products. Judging practice will be secured in a nearby packer cooler, and at the end of the course a one-day trip costing \$10.00 will be scheduled to several large packing houses in Boston. Textbook: Ziegler, "The Meat We Eat." Special equipment needed for this course includes knives, boots, and wash suits—estimated cost \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. PERLEY.

ANIMAL HUSBANDRY S-9. (Special Dairy Cattle Course) I.

For Dairy Industry Seniors and Poultry Husbandry Freshmen. This course will consider briefly the origin, history, development, characteristics and distribution of the five major dairy breeds in the United States. The principles of genetics and the art of breeding better dairy cattle will be emphasized. The balance of the course will include basic principles of dairy cattle feeding as well

as profitable management of the dairy herd. Laboratories will be devoted to judging dairy cattle and to various exercises and problems concerned with the feeding, breeding and management of dairy cattle. A half-day field trip to nearby beef and sheep operations and a one-day field trip to successful dairy farms are required in the course. Estimated cost \$5.00. Textbook: Petersen, "Dairy Science."

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
PROFESSOR FOLEY.

Note—Every student in this major must pass a qualifying test in milking. Arrangements for practice periods and examinations by special assignment. No student will be put in placement training who has not satisfied this preliminary requirement.

Most major courses in Stockbridge provide time for classes on subjects offered by the Department of Agricultural Engineering at the University. The Stockbridge student learns the capability of machines, the problems in servicing them, and safety in their use. He learns of the versatility of electric power, and that controls for this power vary from the wall switch for the living room lights to the radio vacuum tube which can operate the poultry house ventilating system. He learns about strength of materials used in machines and buildings, and that the strength of a building to withstand storm can be calculated, so that design is one of the better forms of insurance. He becomes familiar with the farm level, a little brother of the engineer's transit, and learns how to use it in laying out buildings, terraces and ditches. He learns of the ways these things may be useful as tools in farming, rather than the engineering theory which qualifies him for design, research and development. The Stockbridge student learns how to use and maintain his tools, and what to expect of them in farming operations.

These service courses thus serve the purpose of rounding out the student's training in production, management, and mechanization, the inseparable combination in today's farming. Power, mechanical and electrical, in the hands of farm workers will continue to improve the welfare of the farm families of Massachusetts.

DAIRY INDUSTRY

PROFESSOR HANKINSON, ASSISTANT PROFESSOR LINDQUIST,
ASSISTANT PROFESSOR NELSON.

The Dairy Industry course is designed to fit men for positions with market milk concerns, creameries, ice cream plants, and specialized dairy farms.

All dairy industry courses are given in the dairy building (Flint Laboratory), a building devoted especially to dairy work. The building is well equipped with dairy and creamery machinery.

The market milk department contains two complete pasteurizing units, a clarifier, separator, automatic bottle filler and capper, rotary can washer and automatic soaker type bottle washer with conveyor transfer of bottles to the bottle filler and capper.

The ice cream making room contains a pasteurizing vat, homogenizer, cooler, brine and direct expansion freezers, continuous freezer, and additional equipment such as is found in ice cream plants.

The room designed for cheese making is equipped with cheese vats, draining racks, presses, etc. The butter making room contains power churns, workers, scales and other accessories.

The testing laboratories are well equipped with apparatus for the Babcock, Mojonnier, and other tests for the determination of chemical and bacteriological quality of milk products.

Trains for Jobs Like These:

Skilled workers in wholesale and retail dairy plants including laboratory technicians, pasteurizer operators, ice cream mix makers, freezer operators and fancy form decorators, cheesemakers, salesworkers; also dairy equipment and supply salesmen, fieldmen and Dairy Herd Improvement Association testers. Such training supplemented with sufficient practical experience may lead to positions such as assistant plant superintendents and plant managers.

Field trips will be required during the two years at an estimated cost of \$20 per student.

While working in the dairy laboratories, white suits and rubber footwear are required, at an estimated cost of \$10.00.

DAIRY INDUSTRY

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agricultural Economics S1 (Farm Economic Problems)
Agricultural Engineering S1 (Farm Power)
Bacteriology S1 (Bacteriology and Rural Hygiene)
Dairy S1 (General Dairying)
Entomology S3 (Structural Pests)
Foods and Nutrition S3 (Elementary Nutrition)
Practical Science S7
Public Speaking S1

Elective

Physical Education S1 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agricultural Economics S6 (Dairy Business Accounting)
Dairy S2 (Testing Milk Products)
Food Technology S2 (Basic Principles and Freezing)
Food Technology S4 (Special Products)
Practical Science S8
Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Animal Husbandry S9 (Special Dairy Cattle Course)
 Business English S1
 Business Management S3
 Dairy S3 (Ice Cream Making, Cheese, and other Milk Products)
 Dairy S5 (Judging Dairy Products)
 Veterinary Science S1 (Animal Sanitary Science)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Economics S2 (Marketing)
 Agricultural Engineering S6 (Dairy Mechanics)
 Bacteriology S4 (Dairy Bacteriology)
 Dairy S4 (Market Milk and Butter Making)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

DAIRY S-1. (General Dairying) I.

This course takes up the question of the importance of dairying in the United States, and especially in the New England States, giving the development of dairying from the earliest to the present time. It covers the secretion, composition and properties of milk; reasons for variation in the per cent in fat in different samples of milk; the Babcock test for fat in milk and other dairy products; other common milk tests; the advantage of testing herds, Herd Improvement Associations, advanced registry work; the handling of market milk; soft cheese making, ice cream making, and butter making as applied to general farm conditions. The laboratory work consists in testing milk and dairy products for butter fat, solids, and acidity, together with some dairy plant experience in milk handling, butter making, cheese making, and ice cream making.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR LINDQUIST.

DAIRY S-2. (Testing Milk Products) II.

In this course a study is made of the common tests used in dairy industry processes.

The lectures in this course include a discussion of the application of tests, what they indicate and their importance in the dairy plant.

The laboratory work consists of a study of the various dairy laboratory tests such as sediment, flavor, and total solids of milk; moisture, fat and salt determination in butter; moisture test of cheese; the operation of the Mojonnier tester and the modified Babcock tests for fat in dairy products.

In addition to the testing work students will be required to arrange for work about the plant in order to become familiar with dairy plant practices and the operation of dairy machinery.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR NELSON.

DAIRY S-3. (Ice Cream Making, Cheese, and Other Milk Products) I.

This course deals with the making of ice cream, cheese, condensed, evaporated and powdered milk.

The ice cream making portion of the course includes a careful study of modern methods of manufacturing the common frozen dairy products (ice cream, sherbets, ices, frozen puddings, punches, mousses, etc.).

The lecture work includes a discussion of the history of ice cream making, the ingredients found in ice cream, methods of preparing and standardizing mixes, the freezing process, methods of hardening, marketing, and distribution of the finished product.

The laboratory work involves the preparation and standardization of ice cream mixes, the freezing of ice cream and other frozen dairy products, and laboratory tests for butterfat and total solids in ice cream.

In that part of the course dealing with cheese making, a study is made of the

different methods of manufacturing hard and soft cheese (cheddar, brick, cream, neufchatel, olive, nut, cottage, cheese spreads, etc.).

In the lectures the manufacture of the different cheeses is considered, either from the standpoint of marketing the entire milk supply of the dairy or as an economical means of disposing of surplus milk. In the laboratory work the different kinds of cheese are made.

Lectures are also given on the manufacture of the various concentrated products as sweetened condensed, evaporated, and powdered milk; casein, semi-solid buttermilk, dried whey, malted milk, etc.

3 class hours and 3 3-hour laboratory periods a week.

Credit, 8.

ASSISTANT PROFESSOR LINDQUIST, ASSISTANT PROFESSOR NELSON.

DAIRY S-4. (Market Milk and Butter Making) II.

In that part of the course on market milk, a study of the development of the market milk industry is made. Attention is given to the necessary essentials in producing a high grade milk; the economics of milk production and distribution; food value and uses; the advantages and disadvantages of cooperative milk producers' organizations; the various methods of marketing milk; the transportation, processing and delivery of milk; manufacture and marketing of surplus milk in the form of by-products as cream, cultured buttermilk, chocolate milk, etc.

The laboratory work consists of receiving and making quality tests on milk and the operation of the machinery used in processing market milk.

The buttermaking portion of the course includes studies of milk separation with the selection, care, and use of separators; the pasteurization and ripening of cream; the making and use of starters; a study of churns and churning; modern methods of making butter; tests for moisture, salt, fat, and curd content of butter.

3 class hours and 3 3-hour laboratory periods a week.

Credit, 8.

PROFESSOR HANKINSON, ASSISTANT PROFESSOR LINDQUIST.

DAIRY S-5. (Judging Dairy Products) I.

This course is a study of the grading and evaluating of dairy product quality based upon product flavor, odor, appearance, and body and texture characteristics. Consideration is given to identification and correction of quality defects. Judging of milk, ice cream, butter, cheese, chocolate milk, buttermilk and sour cream will be emphasized.

1 2-hour laboratory period a week.

Credit, 1.

MR. SMITH.

DAIRY S-6. (General Course for Poultry Majors) II.

This course takes up the importance of dairying in the United States, and especially in the New England States.

Lectures will be given on secretion, composition, and properties of milk, reasons for variation in per cent of butter fat in different samples of milk. The Babcock test for fat in milk, cream, skim milk and buttermilk, the advantages of testing herds, herd improvement associations, advanced registry work; the handling of market milk, soft cheese making, ice cream making, and butter making, as applied to general farm conditions.

The laboratory work consists mainly in testing milk and dairy products for butter fat.

3 class hours and 1 2-hour laboratory period a week.

Credit, 4.

PROFESSOR HANKINSON.

DAIRY S-8. (Grading and Marketing of Dairy Products) II.

This course is arranged for students specializing in Food Management to provide a basis for the more intelligent selection of dairy products.

It includes a consideration of the composition, food value, selection, and use of the different dairy products; a careful study of the methods of marketing and grading; a survey of processing methods and types of packages; and laboratory practice in testing milk products and in evaluating and identifying eating quality of milk, butter, cheese, and ice cream.

During the semester a trip will be made to leading dairy wholesale markets in Boston, at an estimated cost of \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

PROFESSOR HANKINSON, ASSISTANT PROFESSOR NELSON.

AGRICULTURAL ENGINEERING HELPS TO DEVELOP BETTER FARMING

Since the standard of living of the farm family is determined to a large extent by the size of the farm business, today's farmers are using the results of engineering applied to agriculture to realize a better living. Field operations have been mechanized and better labor efficiency obtained through the application of power and machinery. Proper planning of buildings provides efficiency, economy, and improvement in the appearance of the farmstead. It simplifies the work, and takes advantage of electrically operated machines which do the drudge labor. Proper structural designs provide animal comfort which contribute to higher production, and strengthen the building against the stresses from hurricanes and heavy snows. The use of heat, refrigeration, air cooling, and ventilation all have a part in the conditioning of food and crop storages and animal shelters. Drainage and erosion control devices and irrigation equipment help maintain the productivity of the soil and improve the crops. All of these are production equipment for a great industry—Agriculture. Agricultural Engineering helps develop them, and apply them to the individual enterprise.



CLASS TRIP TO COMMERCIAL TURKEY FARM

POULTRY HUSBANDRY

PROFESSOR JEFFREY, PROFESSOR SANCTUARY, ASSISTANT PROFESSOR BANTA,
ASSISTANT PROFESSOR VONDELL.

There are excellent opportunities in poultry work for men and women who have had the proper training. Graduates from this department have taken their places as leaders in the industry and have filled them capably. Some of them own their own breeding farms, manage or assist in the management of commercial egg farms, while others are in those industries which are closely allied with the production and marketing of poultry products.

Seven specialized courses and two general courses are offered by this department. Those students who specialize in poultry culture take all seven of the specialized courses. The general course is designed to give the students specializing in other branches of agriculture and horticulture the fundamental principles underlying successful poultry raising when a sideline on the farm.

The facilities for practical instruction in poultry husbandry include quarters and equipment in Stockbridge Hall for efficient classroom teaching and demonstrations.

The University Poultry Farm, our practical laboratory, comprises classrooms and laboratories which provide facilities for practice in incubation, breeding, feeding, killing, picking, candling and grading eggs, caponizing, judging, sexing, construction of poultry houses and appliances, and other phases of poultry work.

The well-bred flock of about 1,500 adult birds consists principally of White Plymouth Rocks, Single Comb Rhode Island Reds, Barred Plymouth Rocks, Single Comb White Leghorns and New Hampshires. The largest flocks of approximately 150 birds are used primarily for practical experiments and demonstrations in housing, feeding, breeding and management. Equipment includes several types of lamp and mammoth type incubators; many styles of coal and electric brooders and chick batteries for brooding and rearing approximately 5,000 chicks. A flock of several hundred Jersey Buff Turkeys is maintained.

The practical phases of commercial poultry production are stressed in the courses offered.

Trains for Jobs Like These:

Skilled workers on poultry farms, owner operators and managers; poultry breeding farms; operation of incubators and brooders; wholesale and retail poultry meats; testing, grading and packing eggs; poultry cooperative sales work with eggs, dressed and live fowl; salesmen for poultry feeds and equipment; broiler production and day-old chicks; turkey and duck farms, breeding (record of performance) and disease control (Pullorum) field men.

Field trips will be required during the two years at an estimated cost of \$37 per student. All poultry Stockbridge students will be required to make a trip to the Boston Poultry Show which is held sometime during the month of January. Estimated cost \$6.00.

Poultry Husbandry

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Animal Husbandry S9 (Special Dairy Cattle Course)
Bacteriology S1 (Bacteriology and Rural Hygiene)
Farm Management S3
Poultry Husbandry S1 (Judging and Housing)
Public Speaking S1
Vegetable Growing S9 (General Course)

Elective

Physical Education S1 (Football)

Second Semester

(Four Weeks Residence Instruction Followed by Seven Months Placement Training)
Dairy S6 (General Course)
Poultry Husbandry S2 (Incubation and Brooding)
Poultry Husbandry S12 (Specialties)
Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Economics S1 (Farm Economic Problems)
 Agricultural Engineering S7 (Farm Structures)
 Fruit Growing S9 (General Course)
 Poultry Husbandry S5 (Marketing)
 Poultry Husbandry S7 (Breeding)
 Veterinary Science S1 (Animal Sanitary Science)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S2 (Farm Power)
 Agricultural Engineering S4 (Farm Shop)
 Business English S2
 Farm Management S2 (Farm Management and Accounts)
 Poultry Husbandry S4 (Feeding)
 Poultry Husbandry S8 (Supervised Reading and Management)
 Veterinary Science S2 (Applied Animal Sanitary Science)

Elective

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

POULTRY HUSBANDRY S-1. (Judging and Housing) I.

This course embraces a study of the various economically important types of breeds of domestic fowl, judging for egg production capacity, and for exhibition quality. This course also covers the principles and practices of constructing and equipping houses on a commercial poultry farm. A few trips to nearby poultry plants may be taken to study poultry house ventilation. Two credits for judging; three credits for housing.

3 class hours and 2 2-hour laboratory periods a week.

Credit 5.

PROFESSOR SANCTUARY AND ASSISTANT PROFESSOR BANTA.

POULTRY HUSBANDRY S-2. (Incubating and Brooding) II.

A study of incubation and brooding is made by means of the operation of standard incubators and brooders and through a consideration of basic principles. Students select and grade hatching eggs, operate small incubators and observe mammoth incubators for a period of time. Under supervision each student has charge of a brood of chicks.

The incubation part of the course will consist of three class hours, one laboratory period and one practice period, and will run parallel to the brooding part which will consist of two class hours, one laboratory period and one practice hour.

5 class hours; 2 2-hour laboratory periods and the equivalent of 2 3-hour laboratory periods in incubation and brooding practice. (7 days a week.) Credit, 10.

PROFESSOR SANCTUARY.

POULTRY HUSBANDRY S-4. (Feeding) II.

A study of the scientific principles of nutrition essential to commercial success, with particular emphasis on vitamins. Rations properly balanced for various purposes will be calculated. A comparative analysis of the different methods of feeding is included. Textbook: "Feeding Poultry" by Heuser—Published by John Wiley & Sons.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR BANTA.

POULTRY HUSBANDRY S-5. (Marketing) I.

A study of preparing eggs and poultry products to meet the requirements of the northeastern markets. Grades, prices and reports are studied in conjunction with different marketing methods. The laboratories are designed to cover the field of practical grading, internal study, candling and packing of eggs as well as selection, fattening and killing and dressing poultry by the latest approved methods.

A one-half day class trip to Springfield markets in December is required. Estimated cost, \$2.00. Text: Benjamin, Pierce and Termohlen's "Marketing Poultry Products."

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR VONDELL.

POULTRY HUSBANDRY S-7. (Breeding) I.

This course includes the study of the improvement of poultry by means of mass selection, cockerel progeny, flock improvement, and pedigree methods of breeding. Students follow through each step of a pedigree hatch and assist in the selection of the breeders used at the university plant. Basic principles of heredity necessary for an understanding of good breeding practices are studied. A textbook costing \$3.00 to \$4.00 will be required.

4 class hours; 1 2-hour laboratory; 1-hour practice laboratory a week. Credit, 5.

PROFESSOR SANCTUARY.

POULTRY HUSBANDRY S-8. (Supervised Reading and Management) II.

Each student will be assigned references in the field in which he is most interested. Oral reports will be required. A major part of the work will be the writing of a term paper and students will be graded on their ability to summarize reference reading and on the neatness of their work. Required day trips totalling three or four days to representative commercial poultry areas are made at an approximate cost of \$30.00 per student. The basic factors essential to a financially successful poultry enterprise are analyzed.

3 class hours a week.

Credit, 3.

ASSISTANT PROFESSOR BANTA.

POULTRY HUSBANDRY S-9. I.

This course covers candling and grading of eggs, market classification, a study of eggs in the local markets, dressing poultry and various ways of preparing poultry for the table. Prices and market operations form an active part of the course.

A one-half day class trip to the Springfield markets in December is required. Estimated cost, \$2.00.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR VONDELL.

POULTRY HUSBANDRY S-10. (General Poultry Husbandry) II.

Poultry keeping as a national industry; its importance and geographical distribution; opportunities and possibilities in poultry culture in Massachusetts; principles of feeding; utility classification of fowl; incubation; the production of hatching eggs; the baby chick industry and brooding and rearing. Practical exercises will be closely correlated with the study of breeds and varieties, various types of incubators, brooders, brooder-houses, etc. Textbook: Jull, "Successful Poultry Management." Note: Students who take course S-10 must get permission from the Poultry Department to take advanced poultry courses.

2 class hours and 2 2-hour laboratory periods a week.

Credit, 4.

ASSISTANT PROFESSOR VONDELL.

POULTRY HUSBANDRY S-12. (Specialties) II.

Turkeys, ducks, geese, and game birds are considered. Breeding, incubation, feeding, rearing, management, marketing, housing, and disease control methods and practices are studied. Most of the course is devoted to the study of turkeys.

Textbook: Jull, "Raising Turkeys."

4 class hours a week.

Credit, 4.

PROFESSOR JEFFREY.



SHADE TREE FEEDING

ARBORICULTURE

ASSISTANT PROFESSOR KING

Arboriculture, the care of shade and ornamental trees, is becoming more important here in Massachusetts as the citizens realize the necessity of trees in their everyday life. It includes tree planting; large tree moving; diagnosis and treatment of tree diseases, defects, and mechanical injuries; identification and control of tree insect pests; fertilizing; pruning and repair of storm or otherwise damaged trees; and removal of dead or undesirable trees. A growing appreciation of the value of trees and a demand for a tree maintenance service has led to the development of organizations to supply it. These firms desire trained men. All Massachusetts towns are required to elect tree wardens. At present there are over one thousand men actively engaged in municipal and private tree care in Massachusetts and the future is unlimited on a state basis. Nationally, over 300 million dollars is spent annually on shade and ornamental trees. The men who accept this responsibility should be trained in the requirements of trees and their care. This course is designed to give basic training in the care of shade and ornamental trees to supply these needs.

This University offered the first course in the country on shade tree care in 1895, and now offers the only complete two-year Arboriculture course in the United States. Annually in March, a school of one week's duration for tree wardens is held on the campus. This school brings together tree wardens and men interested in tree care to discuss their problems. Parts of the program of the school will be of interest to students in this course.

Our large campus has a wide variety of trees of all ages with which the student becomes acquainted, and which also serves as a laboratory for problems similar to those one will have to meet in practice. The research laboratory in shade tree diseases for the state is also located on the campus.

The Massachusetts Arborists' Association and the Massachusetts Tree Wardens and Foresters Association have approved this course as a basic training program.

New class group limited to twenty students each year.

Those electing Arboriculture must register two weeks prior to the opening of the fall semester for the preliminary training period. Applicants will be notified of the date of registration. This two-week period before the start of regular class work will be used for intensive training in the use of ropes, climbing, and the use of knots and safety practices. Eight hours a day will be given over completely to this purpose. Only those who qualify in this preliminary program will be permitted to take the course in Arboriculture. Those who do not qualify may take the Ornamental Horticulture course. All students applying for the course must have a doctor's certification that they are physically fit. Any heart ailment or other serious weakness automatically disqualifies an applicant.

The University campus of about 700 acres affords an excellent outdoor laboratory for plant identification, tree work and tree diseases.

Field trips will be required during the two years at an estimated cost of forty dollars, other than those conducted during laboratory periods.

Trains for Jobs Like These:

Operators, foremen and salesmen for arboriculture firms, utility line clearance foremen, deputy tree wardens and eventually tree wardens in towns and cities, tree care in estates, parks, state highways, college campuses or grounds of other public institutions, developing one's own service organization for the practice of arboriculture.

Recommended clothes for tree climbing: breeches, good heavy work shirts.

All students qualifying will be required to obtain personal tools for cavity work, a hand saw, and a pair of 14" or 16" high top shoes with rubber or composition soles and heels at an approximate cost of \$50.00.

An accident insurance policy will be required of all prospective students. Such a policy will be available at the University at time of registration.

Arboriculture

First Year

First Semester

(Eighteen Weeks Resident Instruction)
 Agronomy S1 (Soil Management)
 Agrostology S1 (Basic Factors and Uses of Turf Areas)
 Arboriculture S0 (Tree Climbing. Special Qualifying Course)
 Arboriculture S1 (Practices and Policies)
 Botany S1 (Tree Physiology)
 Horticulture S1 (Plant Materials, Trees)
 Public Speaking S1

Elective

Physical Education S1 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
 Agricultural Engineering S2 (Power Units)
 Agronomy S2 (Fertilizers)
 Arboriculture S2 (Continuation of S1)
 Botany S2 (Diseases of Trees and Shrubs)
 Entomology S4 (Insect and Related Pests of Shade and Ornamental Trees and Shrubs)
 Horticulture S2 (Plant Propagation)
 Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Arboriculture S3 (Diagnosis and Control)
 Arboriculture S7 (Shade Tree Surveys and Cost Estimates)
 Business English S1
 Entomology S5 (Control of Insect and Related Pests of Shade and Ornamental Trees and Shrubs)
 Forestry S3 (Farm Forestry)
 Horticulture S3 (Surveying and Mapping)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Arboriculture S4 (Diagnosis and Control)
 Arboriculture S6 (Shade Tree Spraying)
 Arboriculture S8 (Shade Tree Surveys and Cost Estimates)
 Fruit Growing S4 (Fruit Pests and Spraying)
 Horticulture S4 (Landscape Construction)
 Horticulture S6 (Plant Materials, Shrubs)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Basketball)

ARBORICULTURE S-0. (Tree Climbing) I.

For two weeks previous to the regular opening of school, all students electing this major will attend a special qualifying course in tree climbing. This course will be conducted on the campus for eight hours each day for two weeks to acquaint the student with ropes, tools and climbing techniques. To be enrolled in the arboriculture major all students must pass this qualifying tree climbing practice.

ASSISTANT PROFESSOR KING.

ARBORICULTURE S-1. (Practices and Policies) I.

Factual material covering the phases or types of work; pruning, cabling, bracing, fertilization and line clearance. Laboratory work in the application of class discussion. A one-day trip to attend the annual meeting of the Massachusetts Arborists' Association.

2 class hours and 1 4-hour laboratory period a week.

Credit, 4.

ASSISTANT PROFESSOR KING.

ARBORICULTURE S-2. (Continuation of S-1) II.

Soils, their origin, structure and function as pertaining to tree growth and development. Fertilizers, their use, sources, application and functions of their elements in the growth and development of a tree. Cuts and fills and their treatment and simple cavity treatments. Attendance required at the annual meeting of the Massachusetts Arborists' Association.

2 class hours and 1 4-hour laboratory period a week.

Credit, 4.

ASSISTANT PROFESSOR KING.

ORICULTURE S-3 and S-4. (Diagnosis and Control) I. II.

In dividual and class assignments in the diagnosis of infectious and non-infectious diseases and the proper treatments and corrective measures. Analysis of symptoms and effects common to infectious diseases and environmental influences. Methods and techniques used to determine the causes and their treatments.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR KING.

ARBORICULTURE S-6. (Shade Tree Spraying) II.

Spray materials, equipment, and charts for shade tree insects, fungi, and weed control. The laboratory periods will be devoted to the actual application of spray material in the field. Attendance required at the annual meeting of the Massachusetts Tree Wardens and Foresters' Association.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR KING.

ARBORICULTURE S-7 and S-8. (Shade Tree Surveys and Cost Estimates) I. II.

The use and determination of shade tree surveys. Time and cost estimates and shade tree maintenance programs as determined by shade tree surveys. City planting and planning programs essential for city and street tree care and development. Line clearance, and tree laws of various states.

Arboriculture S-7—A one day trip to attend the Annual Meeting of the Massachusetts Arborists' Association.

Arboriculture S-8—A three day field trip to Connecticut and New York Botanical Garden to visit private, municipal and research organizations.

1 class hour and 1 4-hour laboratory period a week.

Credit 3.

ASSISTANT PROFESSOR KING.

Agriculture Is Big Business

Few farm people and comparatively few other citizens realize the importance of agriculture in this commonwealth of ours according to James A. Dayton, Associate Dean and Director of the University of Massachusetts Extension Service.

Massachusetts is an urban, industrial state; 90 per cent of its people live in urban centers. However, 95 per cent of the land area is rural countryside. Here 10 per cent of the population lives, but only about one-third of these are actually engaged in agriculture. In spite of this small number agriculture is a big business. It is the third largest industry in the state, outranked only by leather and textiles. The farm industry in Massachusetts represents an investment of over \$330,000,000 and in 1950 produced a gross income of approximately \$175,000,000.

In addition to the 3 per cent engaged directly in agricultural production 3 to 4 per cent are in allied industries. In other words these people are serving farmers by obtaining farm supplies and services, and by providing marketing facilities. This means approximately 100,000 jobs with 3,000 to 5,000 replacements each year in order to maintain the industry.

COMMERCIAL VEGETABLE GROWING

PROFESSOR SNYDER, ASSISTANT PROFESSOR TUTTLE, MR. JOHNSON

There are many opportunities for both men and women who complete the Stockbridge School vegetable growing courses. These include the operation of a market garden, truck crop, or greenhouse business; skilled employees of commercial operators; operators or trained employees in the many types of wholesale and retail marketing; employees in responsible positions on private estates, private and state institutions as well as with commercial companies handling agricultural products such as fertilizers, seed and various supplies and equipment.

The production and marketing of vegetable crops is a highly specialized business involving a background of technical training as well as a knowledge of practical skills. The staff and facilities of the Department of Vegetable Growing are well qualified and adequate to give a thorough training to students in the fundamentals essential to growing, harvesting and marketing the many vegetable crops commonly grown in New England.

In addition to the facilities of the Department, trips will be made to several production areas and markets to observe actual operations.

Trains for Jobs Like These:

Skilled workers on market garden and truck farms, growers of commercial vegetable crops in greenhouses, cold frames, and fields. Operating all types of farm machinery, tractors, cultivators, seeders, both motor and horse-drawn; preparing crops for market, sorting, grading, bunching, packing. Wholesale and retail sales and distribution. Workers for seed-growing firms, plant breeding and field work on testing plots. Operators, owners, managers of vegetable crop farms. State and federal market inspectors on commercial grades and packs. Buyers and inspectors for dehydration and quick freezer plants. Institutional farm managers.

Field trips will be required during the two years at an estimated cost of \$40 per student.

Commercial Vegetable Growing

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Business English S1
Floriculture S3 (Greenhouse Management)
Fruit Growing S1 (Growing Tree Fruits)
Public Speaking S1
Vegetable Growing S1 (Principles of Vegetable Culture)
Vegetable Growing S3 (Systematic Vegetable Growing)

Elective

Physical Education S1 (Football)

First Semester

(Sixteen Weeks Resident Instruction)
Agricultural Engineering S1 (Farm Power)
Agricultural Engineering S9 (Drainage and Farm Structures)
Beekeeping S1 (Fall Management, Wintering, Honey, and Bee Diseases)
Fruit Growing S7 (Small Fruits)
Vegetable Growing S5 (Market Practices)
Vegetable Growing S7 (Commercial Vegetable Growing)

Elective

Physical Education S5 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agronomy S2 (Fertilizers)
Floriculture S2 (Greenhouse Construction and Heating)
Fruit Growing S2 (Orchard and Vineyard Pruning)
Poultry Husbandry S10 (General Course)
Public Speaking S2
Vegetable Growing S2 (Principles of Vegetable Culture)
Vegetable Growing S12 (Diseases, Insects, and Their Control)

Electives

Physical Education S4 (Basketball and Hockey)

Second Year

Second Semester

(Sixteen Weeks Resident Instruction)
Beekeeping S2 (Spring Management, Pollination and Honey Production)
Farm Management S2 (Farm Management and Accounts)
Food Technology S2 (Basic Principles, Freezing, Canning and Pickling)
Fruit Growing S4 (Fruit Pests and Spraying)
Vegetable Growing S4 (Vegetable Forcing)
Vegetable Growing S6 (Marketing Methods)
Vegetable Growing S8 (Commercial Vegetable Growing)

Electives

Physical Education S4 (Basketball and Hockey)
Physical Education S6 (Baseball)

VEGETABLE GROWING S-1. (Principles of Vegetable Culture) I.

Lecture periods are devoted to discussions covering certain fundamental principles of plant structure and growth as they influence and regulate commercial vegetable culture. The work in the laboratory includes detailed studies in seed-age, plant growing, manures and fertilizers, garden planting, pests, storage and marketing.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-2. (Principles of Vegetable Culture) II.

Lectures are devoted to discussions of the more important environmental factors of the soil and climate which regulate plant growth and reproduction, including water, temperature, light, humidity and wind.

3 class hours a week. Credit, 3
MR. JOHNSON.

VEGETABLE GROWING S-3. (Systematic Vegetable Growing) I.

This course is designed to acquaint the student with the identification, nomenclature and classification of the standard types and varieties of vegetables; judging and exhibiting; seed production and variety improvement work.

1 class hour 2 2-hour laboratory periods a week. Credit, 3.
ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-4. (Vegetable Forcing) II.

A study of the principles and practices involved in growing, harvesting and marketing of vegetable crops commonly grown in forcing structures, especially tomatoes, cucumbers, lettuce, mushrooms and rhubarb. Discussions will also include the growing and handling of vegetable plants for field setting, in plant houses, hotbeds and cold frames.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
MR. JOHNSON.

VEGETABLE GROWING S-5. (Marketing Practices) I.

A study of the various factors and practices involved in harvesting, preparing for market (bunching, tying, wrapping, waxing), grading, packaging, packages used, brands and inspection of vegetables for various market outlets as well as packing house facilities and storage. Trips to nearby and Boston markets will cost approximately \$10.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
PROFESSOR SNYDER.

VEGETABLE GROWING S-6. (Marketing Methods) II.

A continuation of the studies in S-5 covering the marketing of vegetables with emphasis on advertising, salesmanship, roadside markets, wholesale and retail outlets, market reports and transportation by truck, rail and plane.

3 class hours a week. Credit, 3.
PROFESSOR SNYDER.

VEGETABLE GROWING S-7. (Commercial Vegetable Culture) I.

Problems and practices of the commercial grower are discussed as they involve seedage, planting, cultivation, irrigation, tools, machinery, farm organization, and management.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
MR. JOHNSON.

VEGETABLE GROWING S-8. (Commercial Vegetable Culture) II.

This is a continuation of Vegetable Growing S-7 in which the discussions involve the cultural practices for the various vegetables that are of commercial importance in the New England area. Organized trips to market gardening areas are required which cover a period of approximately three days and cost about \$30.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-9. (General Course) I.

This course is designed to meet the needs of students in other majors who cannot devote more than one semester to a study of vegetable growing. Attention is to be given to starting plants early, transplanting, seeding, fertilizing, spraying, dusting, harvesting, marketing, and storing the more important vegetable crops.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

MR. JOHNSON.

VEGETABLE GROWING S-10. (Marketing Methods) II.

A course in the purchasing of vegetables designed only for students specializing in Food Management. It includes studies of the more important vegetables, sources of supplies, seasons of availability, grades, containers, and packs on our markets, and the characteristics associated with quality. Market outlets, types of dealers, and business methods of the vegetable trade will be examined.

A field trip to a wholesale market is required. Estimated cost—\$10.00.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR TUTTLE.

VEGETABLE GROWING S-12. (Diseases, Insects and Their Control) II.

This course is intended to give those students majoring in vegetable growing an understanding of the more common insects and diseases which attack vegetable plants and the most satisfactory methods for controlling these pests.

2 class hours and 2 2-hour laboratory periods a week.

Credit, 4.

ASSISTANT PROFESSOR TUTTLE.

To provide food enough for only "fairly adequate diets" for all of the people of the United States 10 years hence, would require many more poultry products than are now produced, more fruits, 50 per cent more vegetables and a third more dairy products. Per capita consumption of these commodities is increasing. Fortunately these are the important farm products produced in Massachusetts.

Massachusetts farmers are producing more now than ever before—in their 330 years of history. Whether or not Massachusetts agriculture will continue to expand and prosper with the increasing demands for our products, depends upon our ability to increase farm production efficiency through research, education, and the adoption of improved practices such as animal breeding and feeding, plant breeding and fertilization, saving labor, and raising part of our own feed nutrients through improved hay and pasture production.

FLORICULTURE

PROFESSOR THAYER, ASSISTANT PROFESSOR HUBBARD, ASSISTANT PROFESSOR
ROSS, MR. IVES, MR. CORNFOT

Students who complete the major in Floriculture are fitted primarily for work in commercial and private estate greenhouses and retail flower stores. After gaining experience such students may be able to start in business for themselves. With the courses taken in Ornamental Horticulture they are also qualified for positions on private estates, in parks and in nurseries.

The offices and classrooms of the Department are located in French Hall, named in honor of Henry F. French, the first president of the Massachusetts Agricultural College.

The glass area of the Department consists of approximately 14,000 square feet: (1) the French Hall Range of 11,800 square feet, a practical commercial type of range with separate houses devoted to various crops; automatic ventilation has recently been installed in three of these houses; (2) approximately 2,200 square feet in hotbeds and cold frames. In addition, in cooperation with the Department of Botany the Department has the use of the materials in the Durfee Plant Houses which contain primarily a collection of tropical, decorative, and other conservatory plants. During the current year the Durfee Range will be replaced with modern, curved eave type greenhouses having automatic temperature and ventilation controls.

Land is available for the outdoor culture of florists' crops. At present an extensive perennial garden is in process of development.

Trains for Jobs Like These:

Skilled workers in commercial greenhouses and on private estates, growing all types of flower crops; wholesale and retail florists, growers, salesmen, managers; flower arrangement work, designers and decorators in retail flower stores; salesmen for florists' supplies and equipment.

Students who major in Floriculture are required to purchase in the first semester of the first year, Taylor's Garden Dictionary, estimated at \$5.00.

Field trips will be required during the two years at an estimated cost of \$20.00.

Floriculture

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Floriculture S1 (Garden Materials)
Floriculture S3 (Greenhouse Management)
Horticulture S1 (Plant Materials)
Public Speaking S1
Vegetable Growing S1 (Principles of Vegetable Culture)

Elective

Physical Education S1 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
Agronomy S2 (Fertilizers)
Botany S2 (Diseases of Trees and Shrubs)
Entomology S2 (Insect and Related Pests of Florists' Crops)
Floriculture S2 (Greenhouse Construction and Heating)
Horticulture S2 (Plant Propagation)
Public Speaking S2
Vegetable Growing S2 (Principles of Vegetable Culture)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S3 (Farm Shop)
 Business English S1
 Floriculture S5 (Commercial Production)
 Floriculture S7 (Flower Arrangement)
 Fruit Growing S7 (Small Fruits)
 Horticulture S7 (Grounds Maintenance)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Business Management S2 (Fundamentals of Business Management)
 Floriculture S6 (Commercial Production)
 Floriculture S8 (The Uses of Herbaceous Plants)
 Floriculture S10 (Conservatory Plants)
 Horticulture S6 (Plant Materials)
 Vegetable Growing S4 (Vegetable Forcing)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

FLORICULTURE S-1. (Garden Materials) I.

A study of the annuals, biennials, herbaceous perennials, and bedding plants which are commonly used in commercial floriculture and in private estate work. Methods of propagation, culture and uses are considered. Laboratory exercises include work in propagation, planting, identification of materials and planning of beds and borders.

3 class hours and 1 2-hour laboratory period a week. Credit 4.
MR. CORNFOOT AND MR. IVES.

FLORICULTURE S-2. (Greenhouse Construction and Heating) II.

The origin, growth, and importance of the floricultural industry; types of greenhouses, types of construction, painting, glazing, ventilators, beds and benches, and methods of heating. Trips may be taken to visit greenhouse ranges in the vicinity of Amherst with university transportation.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
PROFESSOR THAYER AND MR. IVES.

FLORICULTURE S-3. (Greenhouse Management) I.

A study of the principles of greenhouse management including the consideration of location, soils, fertilizers, watering, ventilation, temperature regulation, insect and disease control. Methods of wrapping and packaging of plants and instruction in elementary plant breeding.

3 class hours and 1 2-hour laboratory period a week. Credit, 4.
ASSISTANT PROFESSOR ROSS AND MR. CORNFOOT.

FLORICULTURE S-5. (Commercial Production) I.

Courses S-5 and S-6 are devoted to a consideration of the important commercial crops. Special attention is given to the culture (under glass) of carnations, roses, chrysanthemums, sweet peas and snapdragons. Other cutflower crops and seasonal pot plants are also considered. Modern methods of production including soilless culture and subirrigation practices are discussed in detail.

All members of the class may be required to take a one-day trip to visit a large commercial greenhouse range at an approximate cost of \$10.00 each.

2 class hours and 1 2-hour laboratory period a week Credit, 3.
ASSISTANT PROFESSOR HUBBARD.

FLORICULTURE S-6. (Commercial Production) II.

A continuation of Floriculture S-5.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSISTANT PROFESSOR HUBBARD.

FLORICULTURE S-7. (Flower Arrangement) I.

The lectures include a discussion of the principles and techniques underlying the use of flowers in corsages, wedding bouquets, vase, bowl, and basket arrangements, table decorations, funeral designs and sprays, and decorations for public functions. The study of color and color harmonies is also considered in this course. The laboratory periods provide opportunity for actual practice in making the various types of arrangements which are considered in the classroom.

Students enrolled in this course are required to take a one day trip to attend the United Florists' Trade Fair and School in Boston.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR ROSS.

FLORICULTURE S-8. (The Uses of Herbaceous Plants) II.

This course is a continuation of Floriculture S-1 and is intended for students majoring in Floriculture and Ornamental Horticulture. It provides opportunity for a more detailed study of many of the plants considered in the preceding course with special emphasis on their uses in gardens and in other types of landscape planting. Lectures, assigned readings, study and identification of plants, planning of borders and gardens.

Students enrolled in this course take a one-half day trip to attend the Western Massachusetts Flower Show in Springfield.

2 class hours and 1 4-hour laboratory period a week.

Credit, 4.

ASSISTANT PROFESSOR HUBBARD and MR. IVES.

FLORICULTURE S-10. (Conservatory Plants) II.

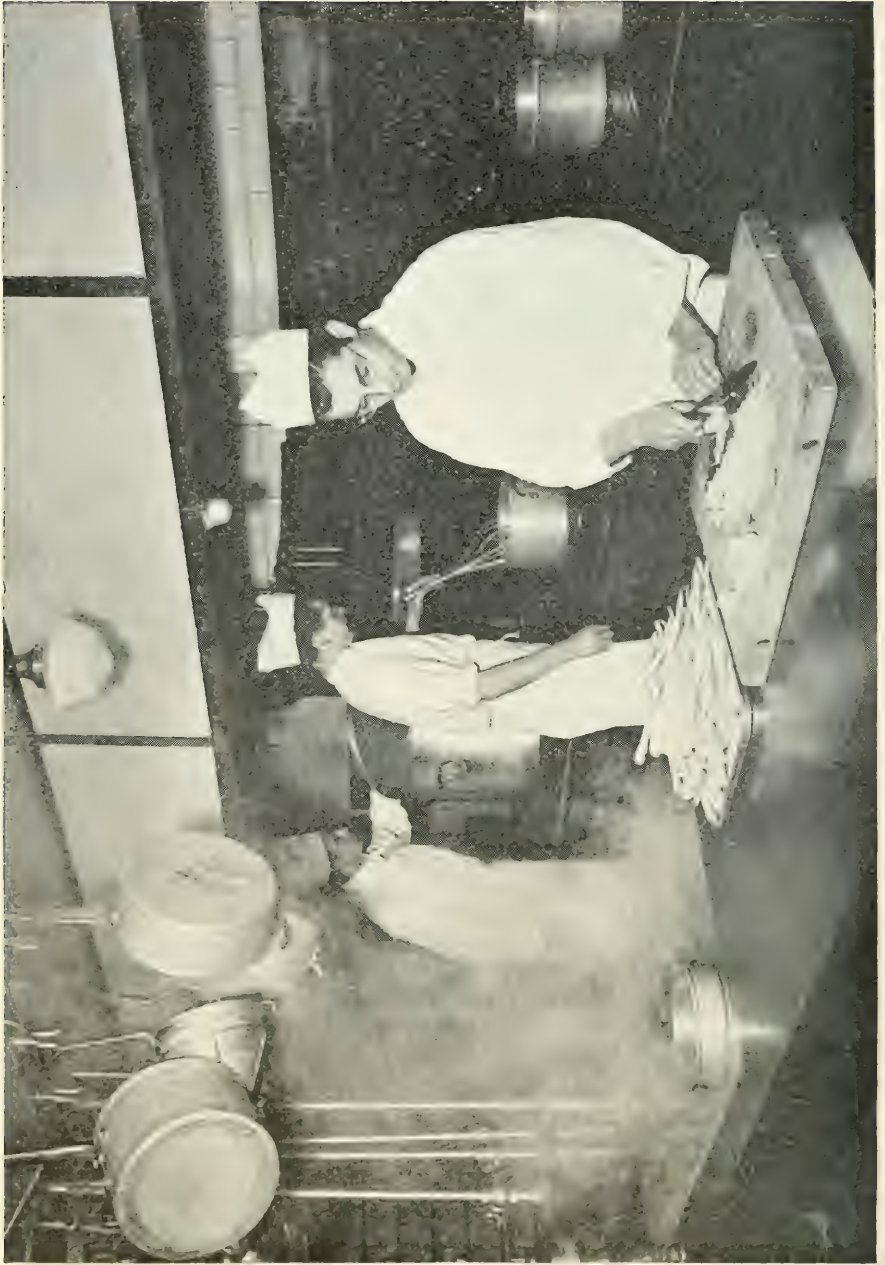
A study of the plants, both foliage and flowering, used in conservatories and in decorative work or sold in the retail flower shop. Methods of propagation, culture, uses and identification of plants are included in the course. Trips may be taken to visit the conservatories at Smith and Mount Holyoke Colleges with university transportation.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

PROFESSOR THAYER and ASSISTANT PROFESSOR ROSS.

About 129,000 citizens of Massachusetts are engaged directly in agricultural pursuits, while a slightly larger number are engaged in "allied industries" which aid the farming industry by obtaining farm supplies and services for production, and then provide the services and facilities for marketing the farm products. This means approximately 100,000 jobs. From 3,000 to 5,000 replacements are required every year to maintain the industry.



A LABORATORY EXERCISE IN FOOD MANAGEMENT—UNIVERSITY COMMONS

FOOD MANAGEMENT

PROFESSOR FELLERS, ASSOCIATE PROFESSOR LEVINE, ASSISTANT

PROFESSOR CULBERTSON, MR. WESTCOTT

Food management work, in all its various trade sub-divisions, is closely allied to food production work. Purchasing agents for wholesale and retail food chains must know vegetables and fruits of all kinds, meats, and dairy products such as milk, butter, cheese and ice cream; poultry products such as fowl, ducks, turkeys, and all kinds of eggs, and egg products. This same knowledge of superior grades, varieties, and packs of all agricultural products, as well as the modern methods of cooling, freezing, preserving, processing, and serving, is highly essential to the hotel and restaurant industry for its supply of future managers, stewards, and operators. Lunchroom, tearoom and all summer resort operators should have thorough training in the procurement of food supplies of superior quality if trade competition and public demands are to be efficiently and economically controlled.

Modern methods of food processing including canning, freezing, dehydration and packing, place a greater responsibility on institutional buyers. Sound knowledge in food production methods may be considered essential to the complete training of stewards, food managers, and restaurant operators. "In-planting" feeding installations for large factories and shops, now offer tremendous fields for food management efficiency and service.

Planning of menus and preparation of food is studied and practiced in this course, along with a complete survey of the whole food production program in agriculture. The excellent equipment of the farms, orchards, food, technology laboratories and dining halls, is a major factor for thorough training which this University provides.

This course is sponsored by the Massachusetts Hotel Association, New England Club Managers, Boston Stewards' Club, and by the Massachusetts Restaurant Association, whose members are cooperating in the placement and employment of students and graduates. The Boston Stewards' Club has generously donated an annual scholarship prize fund and the state hotel association has established a loan fund for student aid.

Due to the nature of the course and need for careful selection of candidates based on scholastic preparation, business objectives, and experience factors determining choice of course, a personal interview here is required of all applicants before final acceptance can be given. Students who select Food Management as a major should have completed a full high school course and must present school record at interview.

Trains for Jobs Like These:

Stewards, assistant stewards, and supervisory positions in restaurants, cafeterias, hotels, country inns and vacation resorts serving both summer and winter clientele. All New England states have a huge business in their country areas, providing home-grown foods and food products for the year-round vacation trade. Many farm homes and boarding houses rely on this type of business for a considerable part of their income. New England foods from shore and farm have earned a distinctive quality which this course seeks to maintain.

Field trips will be required during the two years at an estimated cost of \$52.00 per student.

Food Management**First Year****First Semester**

(Sixteen Weeks Resident Instruction)
 Foods and Nutrition S1 (Basic Food Principles, Meal Planning and Service)
 Foods and Nutrition S3 (Elementary Nutrition)
 General Mathematics S1
 Poultry Husbandry S9
 Practical Science S7
 Public Speaking S1
 Quantity Foods S1 (Preparation and Service)
 Special Lectures S1
 Stewarding S1

Elective

Physical Education S1 (Football)

Second Semester

(Sixteen Weeks Resident Instruction Followed by Four Months Placement Training)
 Agricultural Engineering S12 (Food Handling Equipment)
 Dining Room Management S2
 Food Technology S2 (Basic Principles, Freezing and Canning)
 Practical Science S8
 Public Speaking S2
 Quantity Foods S2 (Preparation and Service)
 Vegetable Growing S10 (Marketing Methods)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year**First Semester**

(Sixteen Weeks Resident Instruction)
 Bacteriology S3 (Food Sanitation)
 Entomology S3 (Structural Pests)
 Food Service Practice S3
 Food Technology S5 (Food Manufacturing)
 Fruit Growing S11 (Fruits and Fruit Handling)
 Hotel Accounting S3
 Kitchen Administration S3
 Special Lectures S3

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Economics S4 (Marketing)
 Animal Husbandry S8 (Food Management Meats)
 Business English S2
 Dairy S8 (Grading and Marketing of Dairy Products)
 Food Service Practice S4
 Hotel Accounting S4
 Hotel Practices S4

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

AGRICULTURAL ECONOMICS S-4. (Marketing) II.

This course is designed to give instruction in purchasing and in management for Hotel Stewards. A study of the distribution system for food products will be given as well as merchandising practices, store location, advertising and personnel management.

2 class hours a week.

Credit, 2.

PROFESSOR LINDSEY.

AGRICULTURAL ENGINEERING S-12. (Food Handling Equipment) II.

A study of the principles of operation, the care and maintenance of kitchen and other equipment used in food preparation for large groups. Refrigeration, heating and cooking, cleaning, and lighting equipment, as well as pumps and electrical appliances are covered in exercises which give incidental practice in soldering, pipe fitting, and the selection of proper wire size.

Through the cooperation of commercial agencies, a one-day period of special instruction on industrial kitchen equipment and commercial lighting applications is provided.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR TAGUE.

ANIMAL HUSBANDRY S-8. (Meats Course) II.

For Seniors in the Food Management Course. This course is designed to impart a knowledge of the fundamental principles involved in judging, purchasing, and efficiently utilizing meat and meat products. Laboratories will involve actual slaughtering, dressing, wholesale and retail cutting, and preparation of by-products. Judging practice will be secured in a nearby packer cooler

and at the end of the course a one day trip costing \$10.00 will be scheduled to several large packing houses in Boston. Textbook: Ziegler, "The Meat We Eat." Special equipment needed for this course includes knives, boots, and wash suits, —estimated cost \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.
MR. PERLEY.

BACTERIOLOGY S-3. (Food Sanitation) I.

This course includes a general study of micro-organisms responsible for the common diseases of man and the methods employed in their detection and control. It introduces the student to the application of bacteriological principles in the analysis of water, milk and milk products, and other food substances. Bacteria, molds, and yeasts are studied as living agents responsible for the decay, spoilage and infection of foods. The importance of the proper control of these living agents in the production and ripening of certain foods is considered. The conditions necessary for microbial growth and factors responsible for the universal distribution of micro-organisms are studied. The application of sanitation, chemical preservatives and physical and environmental conditions in the control of food infection or spoilage is discussed and demonstrated.

This course is designed to give students interested in the practical problems of food sanitation, spoilage, handling, and preservation a better understanding of bacteria and an appreciation of their importance in the sanitary production and handling of foods.

3 class hours a week.

Credit, 3.
MR. WISNIESKI.

DAIRY S-8. (Grading and Marketing of Dairy Products) II.

This course is arranged for students specializing in Food Management to provide a basis for the more intelligent selection of dairy products.

It includes a consideration of the composition, food value, selection, and use of the different dairy products; a careful study of the methods of marketing and grading; a survey of processing methods and types of packages; and laboratory practice in testing milk products and in evaluating and identifying eating quality of milk, butter, cheese, and ice cream.

During the semester a trip will be made to leading dairy wholesale markets in Boston, at an estimated cost of \$15.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.
PROFESSOR HANKINSON, ASSISTANT PROFESSOR NELSON.

DINING ROOM MANAGEMENT S-2. II.

A study of all types of table service for restaurants, hotels, and clubs. Self service operations, cafeterias, coffee shops, in-plant feeding, etc. Time is spent studying various types of banquet, buffet service and dining room organization, and supervision with breakdown of various positions—hostess, headwaiter, captains, waiters, and omnibus boys, etc.

3 class hours a week.

Credit, 3.
ASSISTANT PROFESSOR CULBERTSON.

ENTOMOLOGY S-3 (Structural Pests) I.

This course is offered during the first eight weeks of the first semester. General introduction to Entomology, followed by studies and discussions of more important pests with which hotel stewards would come in contact.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.
PROFESSOR SWEETMAN.

FOODS AND NUTRITION S-1. (Basic Food Principles, Meal Planning and Service) I.

This course aims to teach the basic scientific principles of food preparation. It includes standards for finished products, conservation of nutritive values, foundation recipes, food materials, recent developments in foods, planning preparation of family meals and meal service. Much emphasis is placed upon organization, high standards of work techniques and final products. All work is based on small quantities.

2 class hours and 1 3-hour laboratory period a week.

Credit, 3.

MISS ALICE DAVEY.

FOODS AND NUTRITION S-3. (Elementary Nutrition) I.

This course is designed to give a general survey of the fundamental principles on which the normal person may plan an adequate dietary. It includes a study of the nutritive value of foods so as to make wise selection possible.

3 class hours a week.

Credit, 3.

ASSISTANT PROFESSOR COOK.

FOOD SERVICE PRACTICE S-3 and S-4. I. II.

This course is a practice course in food service. Students will work under supervision of instructor and regular employees of Dining Commons in table service of special parties and functions. Time will also be spent on cafeteria line service. Course must be taken in conjunction with Kitchen Administration S-3, and Hotel Practices S-4. There will be obligatory field trips to study various commercial operations.

1 4-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR CULBERTSON.

FOOD TECHNOLOGY S-2 (Basic Principles, Freezing, Canning and Pickling) II.

Principles of food preservation including refrigeration and modern locker storage management are covered. Work is given in the use of packaging materials and the examination and grading of food products. Three field trips will be required. Estimated cost \$10.00. This is a full semester course for Food Management majors.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

MR. WESTCOTT.

FOOD TECHNOLOGY S-5. (Food Manufacturing) I.

Class work consists of study and laboratory exercises on phases of the food industry of major interest to the students. The studies include food preservation methods, manufacture of carbonated beverages, pickled products, confectionery production and commercial bakery procedures and operations. Some field trips to local commercial food plants will be made.

1 class hour and 1 4-hour laboratory period a week.

Credit, 3.

ASSOCIATE PROFESSOR LEVINE.

FRUIT GROWING S-11. (Fruits and Fruit Handling) I.

This course is designed primarily for students who are specializing in Food Management. It includes:

1. A study of common varieties of native fruits, citrus fruits, and bananas and the season during which each variety is at its best from the standpoint of the consumer.

2. A consideration of the factors which determine grades of various fruits.

3. A thorough study of storage qualities and methods of storing all fruits commonly used here.

A two-day field trip is a part of the course. Estimated cost, \$10.00.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSOCIATE PROFESSOR ROBERTS.

GENERAL MATHEMATICS S-1. I.

This course provides a thorough drill in those fundamentals which are used in practical arithmetic. Fractions, ratio and proportion, percentage, formulas of area and volume, graphs, logarithms, and the use of the slide rule will be studied.

2 class hours a week.

Credit, 2.

MR. NAYLOR.

HOTEL ACCOUNTING S-3 and S-4. I. II.

An introductory course in bookkeeping and accounting. Principles of double entry system, journalizing, posting and closing a practice set of accounts. Study also of balance sheet, and profit and loss statements.

Hotel Accounting S-4 is a continuation of S-3. Use of a practice kit for restaurant, or small hotel. Subsidiary records, inventory controls, food and operating expense percentages.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR CULBERTSON.

HOTEL PRACTICES S-4. II.

A survey course of hotel procedures and practices pertaining to room service, banquets, front office, telephone, reservations, transportation and housekeeping. This course is designed to give an overall picture of the interdependence of each operating department.

3 class hours a week.

Credit, 3.

ASSISTANT PROFESSOR CULBERTSON.

KITCHEN ADMINISTRATION S-3. I.

This course will be a study of kitchen floor plans and layouts, with consideration given to equipment, design, maintenance and operation. Purchase and depreciation principles of food cost control will be studied at length. Field trips are required in this course.

2 class hours a week.

Credit, 2.

ASSISTANT PROFESSOR CULBERTSON.

POULTRY HUSBANDRY S-9. I.

This course covers candling and grading of eggs, market classification, a study of eggs in the local markets, dressing poultry and various ways of preparing poultry for the table. Prices and market operations form an active part of the course.

A one-half day class trip to the Springfield markets in December is required. Estimated cost, \$2.00.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR VONDELL.

PRACTICAL SCIENCE S-7 and S-8. I. II.

This is a course in applied sciences, chiefly in the fields of chemistry and physics, as they are tools serving the needs of the dairy and food industries.

In general, the course is designed to give an introduction to scientific thought and phenomena by means of lectures, textbook study and classroom demonstrations. The emphasis is entirely built around the practical problems in the student's field of work. Practical Science SS is a full semester course for Food Management majors.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR EVERSON.

QUANTITY FOODS S-1, S-2, and S-3. (Preparation and Service) I. II.

This course is planned to give the student an insight into the problems of the kitchen department of the hotel, restaurant or club. Students will be under the supervision of the manager of the University Commons and will be apprenticed to the regular employees there and will assist the cooks, baker, stock clerk, etc., during the laboratory periods. The course is planned so that each student will have the opportunity to do actual work in quantity food preparation and service.

1 4-hour laboratory period a week.

Credit, 2.

ASSISTANT PROFESSOR CULBERTSON.

SPECIAL LECTURES S-1 and S-3. I.

Registration restricted to Food Management students. These lectures will be presented weekly by men within the hotel and restaurant industry and allied professions and by members of the university faculty. They will cover a variety of subjects, all of which will be of interest and value to young people planning to enter the hotel and restaurant business.

1 class hour a week.

Credit, 1.

THE DEPARTMENT.

STEWARDING S-1. I.

A study of principles and practices used in the purchasing, receiving, storing and issuing of all food stuffs. Employee practices, menu planning and pricing, and a study of proper cooking methods.

3 class hours a week.

Credit, 3.

ASSISTANT PROFESSOR CULBERTSON.

VEGETABLE GROWING S-10. (Marketing Methods) II.

A course in the purchasing of vegetables designed only for students specializing in Food Management. It includes studies of the more important vegetables, sources of supplies, seasons of availability, grades, containers, and packs on our markets, and the characteristics associated with quality. Market outlets, types of dealers, and business methods of the vegetable trade will be examined.

A field trip to a wholesale market is required at an estimated cost of \$10.00.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR TUTTLE.

APPLIED FORESTRY

PROFESSOR HOLDSWORTH, PROFESSOR RHODES, PROFESSOR TRIPPENESEE,
ASSOCIATE PROFESSOR RICH, ASSISTANT PROFESSOR MACCONNELL,
MR. GANLEY, MR. ABBOTT

The two year course in applied forestry is intended to equip young men with a sound understanding of the principles of growing wood and doing the work necessary to the handling of forests as productive enterprises.

The men who elect to take the course should fully understand that the vocation for which they are preparing will involve hard work, much of it physical in character. They should also keep in mind that a man trained in forestry techniques will be in a position to advance through apprenticeship to jobs of genuine responsibility.

There is a definite place in the broad field of forestry for trained workers who are capable of understanding and intelligently carrying out the tasks of a sub-professional character which are so necessary to forest maintenance and development.

Men who successfully complete the curriculum in applied forestry are qualified for places with timber growing and forest products industries, for supervision of forested estates, watershed properties, town forests and for work with certain public agencies which are concerned with forestry.

Entrance Requirements: A personal interview with each applicant is required. Mathematics preparation through elementary algebra and plane geometry is necessary. Copy of high school record must be presented at time of interview. Good command of English is essential for report writing on survey and mapping projects.

Student Limitation: Each entering class is limited to eighteen men and must be selected on basis of scholastic preparation, sound purpose, and adequate physical ability.

Facilities: The University owns 2000 acres of forest easily accessible from the campus. This land is used for laboratory and field studies in forestry.

Placement Training: The program of study and vocational preparation requires the students of Applied Forestry to spend four months in suitable placement training. The placement jobs in forestry often require the student to work at considerable distances from home and he should be prepared to do this.

Equipment: The forestry department has good technical equipment for laboratory and field study purposes.

Student Needs: In addition to the regular expense of the Stockbridge School the student must be prepared to buy a hand compass costing about \$12.00; aerial photographs costing about \$8.00, and other drafting and special equipment costing about \$30.00.

Applied Forestry

First Year

First Semester

(Sixteen Weeks Resident Instruction)
Agronomy S1 (Soil Management)
Forestry S1 (Dendrology)
Forestry S5 (Forest Measurement)
Forestry S7 (Forest Physiology)
Forestry S9 (Forest Tools and Equipment,
Use and Care)
Review Mathematics S3

Elective

Physical Education S1 (Football)

Second Semester

(Sixteen Weeks Resident Instruction Followed by Four Months Placement Training)
Business English S2
Forestry S2 (Wood Identification)
Forestry S4 (Forest Improvements)
Forestry S6 (Insects and Diseases)
Forestry S8 (History of Forestry; Forest Economics)

Electives

Physical Education S4 (Basketball and Hockey)
Physical Education S6 (Baseball)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Forestry S11 (Silvics)
 Forestry S13 (Harvesting)
 Forestry S15 (Protection)
 Forestry S17 (Professional Literature and Reports)
 Horticulture S3 (Surveying and Mapping)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Forestry S10 (Forest Management)
 Forestry S12 (Applied Silviculture)
 Forestry S14 (Forest Products)
 Forestry S16 (Seeding and Planting)
 Forestry S18 (Wildlife Management)
 Forestry S20 (Photogrammetry)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

FORESTRY S-1. (Dendrology) I.

The identifying features of the principal North American trees; their botanical classification and geographical distribution; their importance in American forestry. The vegetation regions of the United States and Canada.

1 class hour and 2 2-hour field or laboratory periods a week.

Credit, 3.
MR. GANLEY.

FORESTRY S-2. (Wood Identification) II.

The gross structural and identification features of our most used North American woods. Lectures and laboratory. Each student must equip himself with a 10 power hand lens and a sturdy pocket knife. Instruction is given in the use of identification keys.

3 2-hour periods a week. (For lecture or for exercise in identification).

Credit, 3.
ASSOCIATE PROFESSOR RICH.

FORESTRY S-4. (Forest Improvements. Draughtsmanship) II.

One entire day each week is given to this course. Weather permitting, the day is spent in the field on boundary work, roads, forest structures, internal surveys, mapping. The inevitable portion of bad weather is used in the drafting room in drafting exercises or compiling and recording data.

8 hours practical field work or laboratory a week.

Credit, 4.
ASSISTANT PROFESSOR MACCONNELL and MR. GANLEY.

FORESTRY S-5. (Forest Measurement) I.

Determination of the volume and value of the growing stock by several approved methods. This requires the making of a chain and compass land survey; forest type mapping and the use of tools and instruments common in timber estimating and growth studies.

2 class hours and 1 4-hour laboratory period a week.

Credit, 4.
ASSISTANT PROFESSOR MACCONNELL.

FORESTRY S-6. (Forest Insects and Fungi) II.

A study of the principal forest insects and fungi. Their life histories and identification and the nature of the damage they inflict or the good that they do in the forest.

3 class hours and 1 3-hour laboratory and field period a week.

Credit, 4.
MR. ABBOTT.

FORESTRY S-7. (Forest Physiology) I.

The structure and physiological functions of forest trees and other forest vegetation. Classroom course with demonstrations.

3 class hours a week.

Credit, 3.
MR. ABBOTT.

FORESTRY S-8. (History of Forestry and Forest Economics) II.

The development of forestry and forest policy in America. Certain economic aspects of the developing field of American forestry.

3 class hours a week.

Credit, 3.
PROFESSOR HOLDSWORTH.

FORESTRY S-9. (Forest Tools and Equipment, Care and Use) I.

Exercises in the use and care of ordinary woods tools and equipment including tractor. Construction of usable "home-made" equipment.

1 3-4 hour laboratory period a week.

Credit, 3.
MR. BERNOTAS.

FORESTRY S-10. (Forest Management) II.

The management of American forests; a review of existing management plans representing several forest regions; the preparation of operational management plans.

2 class hours and 1 4-hour field and laboratory period a week. Credit, 4.
ASSISTANT PROFESSOR MACCONNELL.

FORESTRY S-11. (Silvics) I.

The forest qualities and requirements of forest trees including a study of site relationships, growth rates, tolerance, temperature and moisture factors. Special emphasis is laid on the experience of others in the forest use of tree species.

2 class hours and 1 4-hour field period a week.

Credit, 4.
MR. ABBOTT.

FORESTRY S-12. (Applied Silviculture) II.

The intermediate cuttings necessary to the production of wood as a crop; the reproduction methods used in assuring the continuity of the forest in connection with harvesting the mature trees.

2 class hours and 1 4-hour field or laboratory period a week. Credit, 4.
PROFESSOR RHODES.

FORESTRY S-13. (Harvesting) I.

The methods of harvesting various classes of direct forest products used in all parts of the United States. The use of woods tools and machines; practical field work.

2 class hours and 1 4-hour field period a week.

Credit, 4.
MR. GANLEY.

FORESTRY S-14. (Forest Products) II.

A study of the products of American Forest and wood-using industries.

3 class hours a week.

Credit, 3.
MR. GANLEY.

FORESTRY S-15. (Forest Protection) I.

Methods of protecting the forest against fire and the other forest destructive agencies; Regional problems and protective organizations.

3 class hours a week.

Credit, 3.
MR. ABBOTT.

FORESTRY S-16 (Seeding and Planting) II.

Study of forest tree seed; its preparation and use in the forest nursery; the production of forest planting stock and its use in reforestation.

2 class hours and 2 2-hour laboratory periods a week.

Credit, 4.
MR. ABBOTT.

FORESTRY S-17. (Library Study-Research and Reports) I.

Library reading and study on assigned forestry subjects. Written reports and original papers.

3 class hours and 2 hours of supervised library research a week.

Credit, 5.
PROFESSOR HOLDSWORTH.

FORESTRY S-18. (Wildlife Management) II.

Effects of animals on the forest; the effects of forest practices on wild animal habitats and production.

3 class hours a week.

Credit, 3.
PROFESSOR TRIPPENSEE.

FORESTRY S-20. (Forest Photogrammetry) II.

The use of aerial photographs in forest mapping and estimating. Interpretation of photographs; the use of stereoscope, sketchmaster, other standard equipment. A map covering several thousands acres is prepared.

2 class hours and 1 4-hour laboratory period a week.

Credit, 4.
ASSISTANT PROFESSOR MACCONNELL.

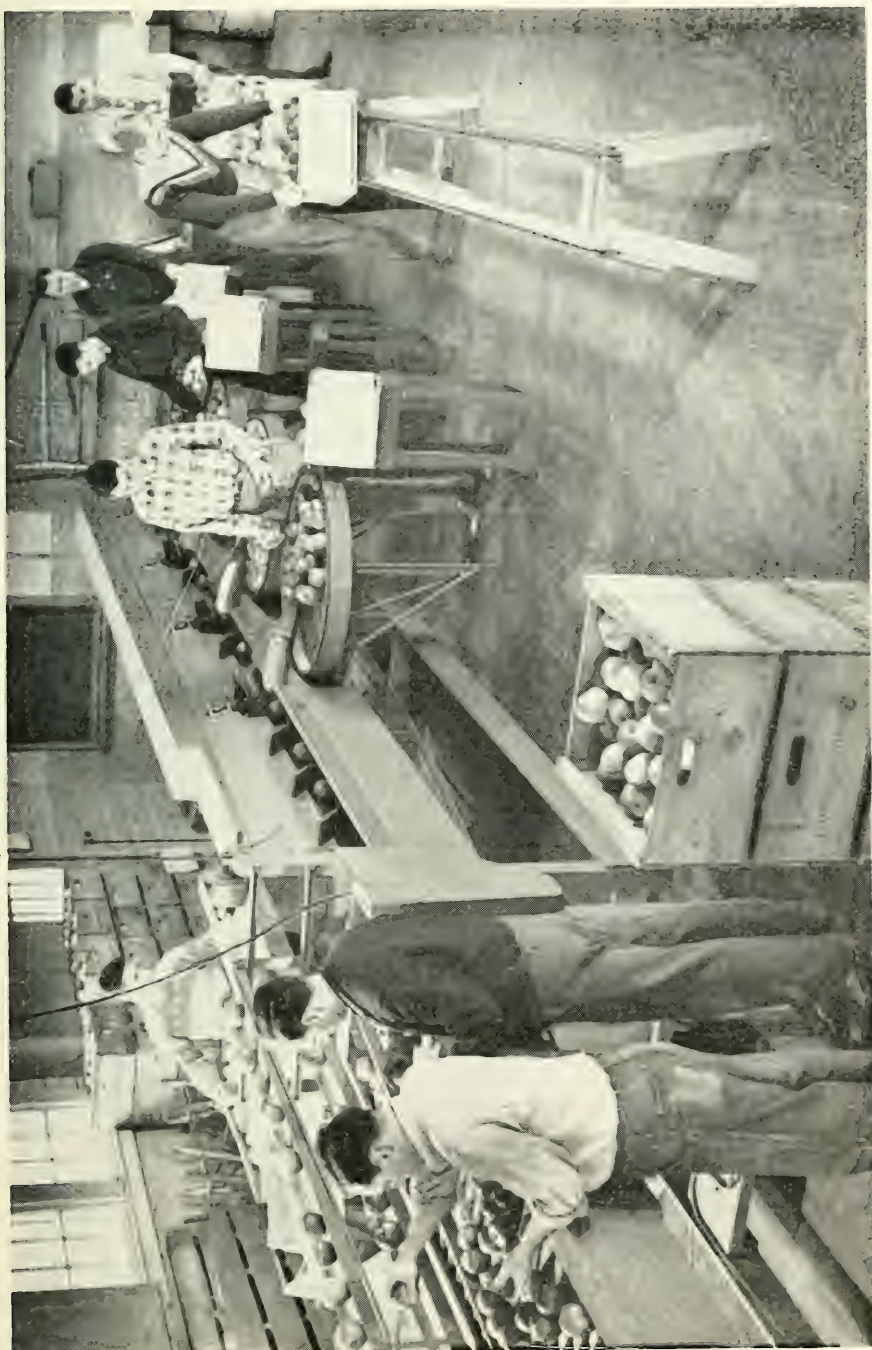
REVIEW MATHEMATICS S-3. I.

A course intending to bring into sharp focus the simple mathematics which is used in vocational forestry and without which such forestry cannot be intelligently practiced. Arithmetic, plane geometry and certain vocational uses of trigonometry are taught.

3 class hours a week.

Credit, 3
MR. NAYLOR.

GRADING APPLES



FRUIT GROWING

PROFESSOR FRENCH, ASSOCIATE PROFESSOR ROBERTS, MR. JAMES ANDERSON

The course in Fruit Growing prepares the student for successful participation in the activities of our many sided fruit industry. An essentially practical course, it emphasizes also the basic principles of plant growth which underlie sound cultural practices and the economic principles which bear upon marketing procedures and the business side of fruit growing. It provides a foundation on which increasing effectiveness may be developed through continued practical experience.

The University has about fifty acres of fruits easily reached from the classroom, which are used freely for purposes of illustration and study. Most of the trees and small fruits commonly found in New England are grown here on a commercial scale. Many experiments and tests are in progress in the plantations, offering exceptional opportunities to the student for the practical study of plant reactions under many and varied conditions. Excellent commercial orchards near the campus provide a wealth of additional material for observation and study. Large markets are visited to afford valuable contacts with the main channels of crop distribution.

Equipment for instruction includes a modern storage and packing house in which there are several types of refrigerated and common storage, a quick freezing unit, and zero temperature holding rooms. The principal types of orchard tools and machines, such as tractors, plows, harrows, cultivators, sprayers, dusters, and pruning and grafting tools are available for study and trial by students. Emphasis is placed on life histories and methods of control of all important insect, fungus and other pests. Materials used in pest control are also studied.

Graduates of the course in Fruit Growing are found in positions of responsibility all over the Northeast. Some have established successful fruit farms of their own. Others, after gaining added practical experience, have risen to positions as managers or foremen in large orchards. Still others have entered the industrial field and are employed by supply and equipment firms or are engaged in marketing activities. Fruit Growing is an active and thriving industry which offers a field of continuing interest and many opportunities for profitable development to the earnest student.

Trains for Jobs Like These:

Skilled workers on fruit farms, operators, foremen, owners; packing house operators, managers of sales and distribution. Salesmen for commercial spray materials, orchard equipment, and fertilizers; fruit inspection and grading. Growers of specialty fruit crops.

Field trips will be required during the two years at an estimated cost of \$25 per student.

Fruit Growing

First Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S1 (Farm Power)
 Agronomy S1 (Soil Management)
 Botany S1 (Tree Physiology)
 Fruit Growing S1 (Growing Tree Fruits)
 Public Speaking S1
 Vegetable Growing S1 (Principles of Vegetable Culture)

Elective

Physical Education S1 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
 Agricultural Engineering S14 (Repair of Farm Equipment)
 Agronomy S2 (Fertilizers)
 Fruit Growing S2 (Orchard Pruning)
 Fruit Growing S12 (Orchard Pests)
 Public Speaking S2
 Poultry Husbandry S10 (General Poultry Husbandry)

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Economics S1 (Farm Economic Problems)
 Agricultural Engineering S9 (Drainage and Farm Structures)
 Beekeeping S1 (Fall Management, Wintering, Honey, and Bee Diseases)
 Business English S1
 Forestry S3 (Woodland Management)
 Fruit Growing S5 (Harvesting, Packing, Storage and Marketing)
 Vegetable Growing S7 (Commercial Vegetable Culture)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Beekeeping S2 (Spring Management, Pollination and Honey Production)
 Farm Management S2 (Farm Management and Accounts)
 Fruit Growing S4 (Fruit Pests and Spraying)
 Fruit Growing S6 (Advanced Fruit Growing)
 Fruit Growing S8 (Small Fruits)
 Vegetable Growing S6 (Marketing Methods)
 Vegetable Growing S8 (Commercial Vegetable Culture)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

FRUIT GROWING S-1. (Growing Tree Fruits) I.

This course covers the planting and development of orchards and the management of bearing trees. The nature of the tree itself is stressed as the basis of sound cultural practices. The selection of sites and soils and varieties is studied for plantations of apples, pears, peaches, plums, and cherries. The handling of young trees to bring them into early profitable bearing is given special attention.

The culture of bearing orchards is studied in detail to give an understanding of the factors that influence yield and quality of fruit. Methods of soil management are considered with reference to their long-time effects on tree and soil. The experimental plots afford exceptional opportunities to study cultural methods and many subjects are discussed in the orchards.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.

PROFESSOR FRENCH AND MR. JAMES ANDERSON.

FRUIT GROWING S-2. (Orchard Pruning) II.

This course aims to give the student a thorough training in the underlying principles and the practice of pruning apples, pears, peaches, cherries and plums. The bearing habit of each fruit is studied as a basis for effective pruning. Practice pruning in the University orchards is stressed as an important feature of the course. Instruction and practice in budding and grafting are included in this course. Bridge grafting and top working are given special attention.

1 class hour and 2 2-hour laboratory periods a week. Credit, 3.

ASSOCIATE PROFESSOR ROBERTS AND MR. JAMES ANDERSON.

FRUIT GROWING S-4. (Fruit Pests and Spraying) II.

This course deals with the characteristics and behavior of insect and disease pests which attack fruit plants. Particular attention is given to the vulnerable points in their life cycles at which control measures are directed. A study of the principal spray materials and their uses is an essential part of the course.

The construction and care of spraying and dusting equipment is emphasized and students are required to use various types of implements in spraying and dusting trees in the orchard.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.

ASSOCIATE PROFESSOR ROBERTS.

FRUIT GROWING S-5. (Harvesting, Packing, Storage and Marketing) I.

Handling the crop from tree to consumer is the field covered by this course. Methods of harvesting and appliances used are studied in the orchards. Practice in packing the most popular containers forms a prominent part of the laboratory work.

The principles of common and refrigerated storage are considered in detail and storage house construction is discussed with a critical examination of several storages in use on or near the campus. Marketing methods as they relate both

to distant and to local markets are given special consideration. A two-day field trip is a part of the course. Estimated cost, \$10.00.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSOCIATE PROFESSOR ROBERTS.

FRUIT GROWING S-6. (Advanced Fruit Growing) II.

This course involves a critical study of tree behavior as a basis for orchard management. Information acquired in other courses and in placement training is brought to bear on important orchard problems. It is the aim of the course to familiarize the student with conditions under which fruit must be grown here, with current thought on the more recent developments, and with adjustments which are being made in the fruit industry of the Northeastern States.

Each student must be prepared to take one or more trips to prominent orchards or to leading fruit sections of the Northeast. Estimated cost, \$15.00.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
ASSOCIATE PROFESSOR ROBERTS.

FRUIT GROWING S-7. (Small Fruits) I.

This course is similar to Fruit S-8, but is given for students majoring in fields other than Fruit Growing.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
MR. JAMES ANDERSON.

FRUIT GROWING S-8. (Small Fruits) II. (For Fruit Majors Only)

There are many unusual opportunities in Massachusetts for success in growing small fruits. This course deals with the establishment and management of plantations of strawberries, raspberries, blackberries, blueberries, currants, cranberries, and grapes. The aim is to make the course of the utmost practical value as well as to give an understanding of the fundamental principles on which practices are based.

The University has plantations of these fruits except cranberries which are used freely for laboratory purposes. Berries which ripen in summer are frozen and held in excellent condition for study in this course.

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
MR. JAMES ANDERSON.

FRUIT GROWING S-9. (General Course) I.

This course is intended to meet the needs of students in other majors who can devote one semester only to the subject of Fruit Growing. It deals with the practical side of growing tree and small fruits for home use and market. Special attention is given to such questions as selection of sites, choice of varieties, grafting, pruning, spraying, soil management, harvesting, and storing. (Horticulture and Poultry majors.)

2 class hours and 1 2-hour laboratory period a week. Credit, 3.
MR. JAMES ANDERSON.

FRUIT GROWING S-10. (General Course) II.

This course is a repetition of Fruit Growing S-9 primarily for the benefit of first year students who are specializing in Animal Husbandry.

4 class hours and 1 2-hour laboratory period a week. Credit, 5.
MR. JAMES ANDERSON.

FRUIT GROWING S-12. (Orchard Pests) II. (For Fruit Majors only)

An introductory course designed to acquaint fruit major students with the principal orchard insects and diseases which may be encountered during placement training. Control measures for these pests are also briefly considered.

2 class hours a week. Credit, 2.
ASSOCIATE PROFESSOR ROBERTS.



ORNAMENTAL HORTICULTURE

ORNAMENTAL HORTICULTURE

PROFESSOR BLUNDELL, ASSISTANT PROFESSOR PROCOPIO, MR. HAMILTON

The constantly increasing interest in development of grounds, both public and private, for use and enjoyment, has created a demand for men trained to handle the varied problems in the construction and maintenance of these grounds. The course in Ornamental Horticulture aims to make the student familiar with these various problems.

Men who have taken this course are to be found in such different jobs as foremen in nurseries, or proprietors of nurseries which they themselves have developed; superintendents on private estates, cemeteries, parks, and various public and private institution grounds; foremen for landscape construction firms, and some have organized their own business in landscape construction and grounds maintenance service.

With the whole campus as a laboratory, the student every day finds problems about him comparable to those he will meet when he goes out to work. The broad lawns, the walks and drives, the gardens, the greenhouses, the orchards, the vegetable plots, as well as the farms, supply all the various phases of work which will be encountered on estates, in parks, or in institution grounds. As far as practicable the student is given the opportunity to determine what these problems are and to solve them himself under expert supervision.

On the campus is to be found a large and excellent collection of mature trees, shrubs, and vines. From these plants the student is able to build up a background of plant knowledge; in identification; in propagation which is carried on in a special greenhouse for the purpose; in the handling of plants in various stages of their growth, in the nursery and on the campus; and in their ultimate care, pruning and protection against injuries of all kinds. Construction of roads, walks, drainage and other problems involving the moving of earth are especially valuable to those looking forward to landscape construction.

Trains for Jobs Like These:

Skilled workers in plant nurseries; gardeners, foremen or superintendents on private estates, public parks, cemeteries, and various public and private institution grounds such as state and government cantonments and hospitals, colleges and private schools; workers or foremen with landscape construction companies, real estate developments; owners and operators of small landscape maintenance businesses and nurseries, salesmen for seed and nursery concerns, plant propagators, town or city watershed foresters, botanic garden foremen.

A special requirement for students in Ornamental Horticulture is one draftsman's set estimated at \$25 and secured at the University store.

Field trips will be required during the two years at an estimated cost of \$20 per student.

Ornamental Horticulture

First Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agronomy S1 (Soil Management)
 Agrostology S1 (Basic Factors and Uses of
 Turf Areas)
 Floriculture S1 (Garden Materials)
 Horticulture S1 (Plant Materials)
 Public Speaking S1
 Vegetable Growing S1 (Principles of Vegetable
 Culture)

Elective

Physical Education S1 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed
 by Six Months Placement Training)
 Agronomy S2 (Fertilizers)
 Agrostology S2 (Turf Maintenance)
 Botany S2 (Disease of Trees and Shrubs)
 Entomology S4 (Insect and Related Pests of
 Shade and Ornamental Trees and Shrubs)
 Horticulture S2 (Plant Propagation)
 Horticulture S10 (Horticultural Practices)
 Public Speaking S2
 Vegetable Growing S2 (Principles of Vegetable
 Culture)

Elective

Physical Education S4 (Basketball and
 Hockey)

Second Year**First Semester**

(Sixteen Weeks Resident Instruction)
 Arboriculture S1 (Practices and Policies—
 Lectures only)
 Business English S1
 Entomology S5 (Control of Insect and Re-
 lated Pests of Shade and Ornamental Trees
 and Shrubs)
 Floriculture S3 (Greenhouse Management)
 Forestry S3 (Farm Forestry)
 Fruit Growing S9 (General Course)
 Horticulture S3 (Surveying and Mapping)
 Horticulture S7 (Grounds Maintenance)

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Arboriculture S2 (Practices and Policies—
 Lectures only)
 Floriculture S8 (Uses of Herbaceous Plants)
 Fruit Growing S4 (Fruit Pests and Spraying)
 Horticulture S4 (Landscape Construction
 Problems)
 Horticulture S6 (Plant Materials)
 Horticulture S8 (Nursery Practices and Man-
 agement)

Electives

Physical Education S4 (Basketball and
 Hockey)
 Physical Education S6 (Baseball)

HORTICULTURE S-1. (Plant Materials) I.

Study of evergreen and deciduous trees used in landscape work, their distinguish-
 ing characters, and culture, with special reference to nursery and planting
 practice.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

PROFESSOR BLUNDELL.

HORTICULTURE S-2. (Plant Propagation) II.

This course will present the principles of plant propagation with special refer-
 ence to their application to plant materials in nursery and greenhouse practice.
 The lectures are concerned with careful explanation of seedage, cuttage, graftage,
 layerage and division. In the laboratory the student propagates plants by each
 of these methods.

2 class hours and 2 2-hour laboratory periods a week.

Credit, 4.

ASSISTANT PROFESSOR PROCOPIO.

HORTICULTURE S-3. (Surveying and Mapping) I.

Practice in the use of simple surveying instruments as tapes, compasses, and
 levels used in the measurement of land surfaces, and the application of these
 instruments in landscape construction.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. HAMILTON.

HORTICULTURE S-4. (Landscape Construction Problems) II.

Continuation of Horticulture S-3, including the reading of landscape plans,
 figuring construction costs on grading work and garden construction problems,
 and setting stakes for landscape development from working drawings.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

MR. HAMILTON.

HORTICULTURE S-6. (Plant Materials) II.

Study of shrubs, both evergreen and deciduous, woody vines, to enable the
 student to recognize the plants used in ornamental plantings and to familiarize
 him with the handling of these plants both in nursery practice and landscape
 work. A two-day field trip will be required. Estimated cost, \$10.00.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

PROFESSOR BLUNDELL.

HORTICULTURE S-7. (Grounds Maintenance) I.

A course based upon the formulation and study of a work program which considers those essential operations contributing to successful horticultural management of grounds. The care of woody ornamental plants is included under the following heads: planting, pruning, maintenance of soil fertility, winter protection, and pest control. For non-majors only.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR PROCOPIO.

HORTICULTURE S-8. (Nursery Practices and Management) II.

For Ornamental Horticulture majors only. This course deals with the propagation, maintenance and planting of nursery plants. Laboratory work includes experience in advanced methods of propagation, lining out stock in cold frames and in the field, pruning, root pruning, and planting. Emphasis is placed on development of supervisory capacity. The student is given the opportunity to develop a nursery program. A one day field trip to Education Day of the Annual Convention of the New England Nurserymen's Association will be required. Estimated cost: \$5.00.

2 class hours and 1 2-hour laboratory period a week, first half of semester.

1 class hour and 1 4-hour laboratory period a week, last half of semester.

Credit, 3.

ASSISTANT PROFESSOR PROCOPIO.

HORTICULTURE S-10. (Horticultural Practices) II.

This course is in preparation for placement and takes up such horticultural practices as pruning, planting, winter protection, and pest control, as relating to a gardening or nursery program.

1 4-hour laboratory period a week.

Credit, 2.

PROFESSOR BLUNDELL.

TURF MAINTENANCE

ASSOCIATE PROFESSOR DICKINSON, ASSISTANT PROFESSOR ROBERTS

There is an immediate need for skilled supervisors and assistants to park, cemetery, and recreation area superintendents: Municipal and private golf clubs are expecting that their superintendents shall be trained in turf maintenance. Every city and large town offers splendid opportunities for the private business horticulturist who is especially well trained to "take care of the lawn."

As the many proposed memorial parks, play fields, public buildings and golf courses are being constructed and completed, the demand for specialists in turf maintenance will be increased and the number of replacements needed annually will be large.

This course is arranged and taught in such a manner that a student who has completed the work will be well qualified to accept a position as assistant or the actual superintendency of a small park, cemetery, or golf course, or to establish a business in his community.

Laboratory and field exercises give practical experience and demonstrations. Good equipment is supplemented by loans from manufacturers and supply houses. The supporting courses are strong and have been carefully chosen for their close alliance to the problems of turf maintenance and general estate work.

Each student's placement training and special interest will be considered in his chosen field, whether it be park, cemetery, golf course, or private business, and professional men will visit the classes to give of their experiences. Every student will be required to keep a record of work done, results obtained, and observations made during the placement training period, for use during the senior year.

Positions Capable of Holding at Graduation:

Assistant to superintendents or as an actual superintendent on golf course, cemetery, a park, or with a commercial nursery or landscape service company, also with golf course construction companies and equipment supply dealers.

At least one field trip will be required during the second semester of the senior year. The total cost of such a trip or trips to each student will not exceed \$20.00.

TURF MAINTENANCE

First Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agronomy S1 (Soil Management)
 Agrostology S1 (Basic Factors and Uses of Turf Areas)
 Floriculture S1 (Garden Materials)
 Horticulture S1 (Plant Materials)
 Public Speaking S1
 Vegetable Growing S1 (Principles of Vegetable Growing)

Elective

Physical Education S1 (Football)

Second Semester

(Eight Weeks Resident Instruction Followed by Six Months Placement Training)
 Agronomy S2 (Fertilizers)
 Agrostology S2 (Turf Maintenance)
 Business English S2
 Entomology S6 (Turf Insects)
 Horticulture S2 (Plant Propagation)
 Public Speaking S2

Elective

Physical Education S4 (Basketball and Hockey)

Second Year

First Semester

(Sixteen Weeks Resident Instruction)
 Agronomy S7 (Soil Plant Relationship)
 Agricultural Engineering S9 (Structures and Drainage)
 Agrostology S3 (Business of Turf Management)
 Arboriculture S1 (Lectures)
 Horticulture S3 (Surveying and Mapping)
 Report Writing S3

Elective

Physical Education S5 (Football)

Second Semester

(Sixteen Weeks Resident Instruction)
 Agricultural Engineering S16 (Irrigation and Soil Conservation)
 Agrostology S4 (Practical Problems)
 Arboriculture S2 (Lectures)
 Floriculture S8 (The Uses of Herbaceous Plants)
 Horticulture S4 (Landscape Construction)

Electives

Physical Education S4 (Basketball and Hockey)
 Physical Education S6 (Baseball)

AGROSTOLOGY S-1. (Basic Factors and Uses of Turf Areas) I.

Starting with an appreciation of the grass plant the course carries the fine turf grasses from seed through uses. Identification of seed and vegetative growth. The limits of tolerance and factors affecting them are studied and correlated with the adaptation of the species to the user's specifications for various conditions.

3 class hours and 2 2-hour laboratory periods a week.

Credit, 5.

PROFESSOR DICKINSON, ASSISTANT PROFESSOR ROBERTS.

AGROSTOLOGY S-2. (Construction and Maintenance of Turf Areas) II.

The student will adapt factors determined in the first semester to the practical construction of new turf areas and maintenance of existing turf. Fertilizing, controlling disease, clipping, watering, etc.

4 class hours and 2 2-hour laboratory periods a week.

Credit, 6.

PROFESSOR DICKINSON.

AGROSTOLOGY S-3. (Turf Maintenance As a Business) I.

This course is primarily for those students desiring to become professional turf growers such as superintendents of golf courses, cemeteries, or parks. The cultural costs as well as the monetary costs are studied. Equipment, fungicides, insecticides and herbicides are evaluated. Experiences gained during summer placement are thoroughly discussed.

3 class hours and 2 2-hour laboratory periods a week.

Credit, 5.

PROFESSOR DICKINSON.

AGROSTOLOGY S-4. (Practical Problems) II.

Designing, report making and presenting, field trips, equipment maintenance and practical problems to summarize the work of preceding courses.

4 class hours and 1 3-hour laboratory period a week.

Credit, 5.

PROFESSOR DICKINSON.

Although Massachusetts is predominantly an urban-industrial state, with 90 per cent of its people living in towns and cities, agriculture is one of the top three industries of the State.

Ninety-five per cent of Massachusetts' land area is open rural countryside. Ten per cent of our population (about 430,000) live comfortably in these areas. About one-third of these rural folks (141,000) live on the 30,000 farms and depend upon agricultural production as the principal source of income.

The Massachusetts farm industry represents an investment in land, buildings, equipment and live stock of over 300 million dollars. Its gross income for 1950 was approximately 175 million dollars.

RELATED SUBJECTS IN OTHER DEPARTMENTS

AGRICULTURAL ECONOMICS S-1. (Farm Economic Problems) I.

The purpose of this course is to introduce students to the more important economic problems facing New England farmers. Increasing competition with other farm sections, long-time movements of farm prices and farm profits, farm credit, farm taxation; tariffs and other farm relief measures are some of the problems to be considered.

2 class hours a week.

Credit, 2.

MR. CALLAHAN.

AGRICULTURAL ECONOMICS S-2 and S-3. (Marketing) I. II.

This course deals largely with economic problems arising out of marketing farm products. Particular attention is given to marketing methods used in New England and to the comparison of local methods with methods used by farmers in competing sections. Principles and methods of co-operative marketing used by successful co-operative associations are studied in detail in order to show how New England farmers may meet competition from associations in other sections, either as individual producers or as officers or members of local associations.

3 class hours a week.

Credit, 3.

MR. CALLAHAN.

AGRICULTURAL ECONOMICS S-6. (Dairy Business Accounting) II.

Business arithmetic and bookkeeping are given consideration. The mathematics of fat determination, ice cream mixes, etc., are studied. An understanding of elementary bookkeeping principles involved in milk distribution also forms a part of the course.

3 class hours and 2 2-hour laboratory periods a week.

Credit, 5.

PROFESSOR LINDSEY AND MR. CALLAHAN.

AGRICULTURAL ENGINEERING S-1 and S-2. (Farm Power) I. II.

A study of the principles of the gasoline engine and its accessories, as used in trucks, tractors and power units; and the application of electricity to farm operations, with particular emphasis on the selection, care and maintenance of electric motors. Exercises cover trouble shooting and minor repairs to gasoline engines; and the selection of proper wire size, overload protection, and the electrical equipment for farm electric appliances.

3 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR TAGUE AND MR. PIRA.

AGRICULTURAL ENGINEERING S-3 and S-4. (Farm Shop) I. II.

The purpose of this course is to teach the student the manner in which adequate tools in a farm shop can assist in solving farm construction and maintenance problems. Instruction is given in the care and use of carpenter's tools through exercises in bench work, repair of farm equipment, and building construction, including the mixing and placing of concrete. Exercises covering domestic water systems and the repair of farm machinery give the student experience in arc and gas welding, pipe fitting, soldering, and the use of machinist's tools. While the time is too limited for the student to develop much skill, the capabilities of the equipment can be adequately demonstrated.

3 2-hour laboratory periods a week.

Credit, 3.

MR. PIRA AND MR. POWERS.

AGRICULTURAL ENGINEERING S-6. (Dairy Mechanics) II.

Designed for men who are fitting themselves for work in dairy plants and allied work, this course covers the principles and equipment involved in processing and refrigeration of milk products, together with the instrumentation necessary for process control.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR PATTERSON.

AGRICULTURAL ENGINEERING S-7 and S-8. (Farm Structures) I. II.

A study of principles of design of farm buildings, utilizing elementary structural mechanics and the characteristics of building materials. Experience in developing construction details results from the complete planning of a major farm building by the individual student.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

ASSOCIATE PROFESSOR MARKUSON.

AGRICULTURAL ENGINEERING S-9 and S-10. (Farm Structures and Drainage) I. II.

A study of building materials, details of construction, simple structural mechanics, and the principles of design applied to farm buildings. Each student will design in detail one of the major farm buildings in which he is particularly interested.

About one-fourth of the time is given to the study of land drainage practice and the use of the engineer's level in laying out drainage systems.

1 class hour and 3 2-hour laboratory periods a week.

Credit, 4.

ASSOCIATE PROFESSOR MARKUSON.

AGRICULTURAL ENGINEERING S-14. (Repair of Farm Equipment) II.

Instruction in the capabilities of arc and gas welding, soldering, pipe fitting, and machinist's tools in the repair and construction of farm machinery and miscellaneous farm equipment. Exercises cover the repair of machines and the study of pumps and water systems.

3 2-hour laboratory periods a week.

Credit, 3.

ASSISTANT PROFESSOR PATTERSON

AGRICULTURAL ENGINEERING S-16. (Irrigation and Soil Conservation) II.

The principles of design for irrigation systems and soil conservation practices applicable to the management of large turf areas.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.

PROFESSOR STAPLETON.

AGRONOMY S-1. (Soil Management) I.

Every agricultural interest is vitally concerned with the soil, its adaptations and its management for plant production. This course treats of the selection of suitable soils for the special purpose of agriculture, horticulture and floriculture.

Laboratory includes training in the use and interpretation of the maps of the U. S. Soil Survey and in tests of soil texture, organic matter and soil acidity. Practical field work will be given in judging the crop adaptation and value of soils.

As a field project the student will be required to make a study of some farm, nursery or florist's plant, from the standpoint of soil conditions and methods of soil management in relation to the enterprise as a whole.

2 class hours and 1 3-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR THAYER, MR. ZAK
AND TEACHING FELLOWS.

AGRONOMY S-2. (Fertilizers) II.

This course deals with the origin, manufacture, purchase and use of commercial fertilizer materials. A study will be made of the interpretation of fertilizer formula, analysis and guarantee. Special attention will be given to the newer concentrated fertilizer materials and to those produced from atmospheric nitrogen. The laboratory work will give practice in the identification of fertilizer materials, in the calculation of fertilizer formulas, and in the preparation of fertilizer mixtures.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

ASSISTANT PROFESSOR THAYER, MR. ZAK
AND TEACHING FELLOWS.

AGRONOMY S-4. (Field Crops) II.

The lecture hours of this course will be devoted to presentation and discussion of the most successful methods of fertilizing, cultivating, harvesting, and storing the field crops grown in New England. Special attention will be given to the choice of the best adapted varieties for the production of hay, pasture, corn, potatoes, and root crops.

The laboratory work will include the study of corn and potato varieties, identification of grass and weed species, and studies of purity and germination. Field observations of growing crops will be included as the season permits.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.

MR. PARSONS.

AGRONOMY S-7. (Soil-Plant Relationship) I.

Elementary soil chemistry and soil physics are related to fundamental plant physiological processes. The absorption, utilization, and functions of nutrient elements by plants are related to their occurrence, chemical changes, and supply in soils.

2 class hours a week.

Credit, 2.

PROFESSOR COLBY.

BACTERIOLOGY S-1. (Bacteriology and Rural Hygiene) I.

The reproduction, structure, growth, changes produced by the action of bacteria upon various substances and the methods by which disease producing bacteria of man and animals are disseminated will be studied. The proper use of disinfectants, vaccines and serums in the control and treatment of disease will be discussed. The purpose of the course is to present the problems of applied bacteriology in health, agriculture and industry. The sanitary production, handling and distribution of milk involving human and environmental contacts with a food often consumed raw is an important problem to be controlled by responsible citizens of the community. Discussions on milk include the various sources of milk infections, methods of controlling sanitary production and marketing and the detection and elimination of milk dangerous to the public health.

Water supplies are of especial importance to man. The construction of wells, cisterns, etc., will be briefly considered and the application of sanitary measures to prevent and control their pollution will be discussed. The proper treatment and disposal of private and municipal sewage presents a problem of no small importance. Work has been planned in this course to present some of the problems pertaining to the sanitary production and distribution of foods.

This course is designed to acquaint the student with the nature and importance of micro-organisms and thus better explain biological changes in nature and susceptibility to disease. (Animal Husbandry, Poultry Husbandry, and Dairy Industry majors.)

3 class hours a week.

Credit, 3.

MR. LARKIN.

BACTERIOLOGY S-4. (Dairy Bacteriology) II.

Bacteria and other micro-organisms are the responsible agents for changes which occur in milk, and for the contagion which sometimes causes diseases. They are found in milk at times when leaving the udder. They get in with the dust and dirt while milking and they adhere to the dairy utensils which carry them over from one milking to the next. From cow to the consumer there is the constant presence of these micro-organisms to contend with, on the one hand, and to foster on the other.

Many of these changes occurring in milk are undesirable, such as ropy milk, sour milk, bitter milk, tainted milk, etc. Many of these changes are encouraged as the ripening of cream for butter, of milk for cheese, of milk for milk drinks. The former are fought, the latter fostered.

Micro-organisms of typhoid fever, scarlet fever, diphtheria and other diseases find their way by means of milk to the consumer and produce epidemic forms of these diseases.

Various bacteriological tests for the estimation of the numbers and types of organisms in milk are studied. Special attention is given to the interpretation of results indicated by the standard plate, Breed, methylene blue, and Burri methods of testing milk quality. Laboratory procedures for the determination of special groups of bacteria not normally found in milk, such as fecal contaminants and heat resistant organisms, are discussed. The proper use of these methods will quickly enable one to locate the source of trouble and check any further continuance.

It is evident, therefore, that to handle milk and milk products safely it is desirable to know something of the agents which are the source of so much attention in the dairy. This indicates the nature of this course, which is required of all students who elect dairying as one of their special lines of work.

1 class hour and 2 4-hour laboratory periods a week.

Credit, 5.

MR. LARKIN.

BEEKEEPING S-1. (Fall Management, Wintering, Honey, and Bee Diseases) I.

The students are given an opportunity for individual handling of bees in the early fall, and field studies are made of the bee colony and its organization. Studies and practice in fall management are followed by a similar treatment of winter protection and the bees are then prepared for winter. During the latter part of the semester the surplus honey is extracted and prepared for market, a laboratory study made of the product and, finally, the commoner bee diseases are discussed and methods of control pointed out.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSOCIATE PROFESSOR SHAW.

BEEKEEPING S-2. (Spring Management, Pollination, and Honey Production) II.

The first part of the semester is occupied in assembling and studying the equipment used in beekeeping, but as soon as the weather permits, work is resumed on the bees in the apiary. Studies are made in spring management; pollination in the apple orchards is particularly stressed, and attention is then turned to the preparation of the colonies for honey production.

Throughout the entire course, wherever possible, the work is made practical and individual, enough theory being given so that the student will understand the reasons for his manipulations.

1 class hour and 1 2-hour laboratory period a week.

Credit, 2.

ASSOCIATE PROFESSOR SHAW.

BOTANY S-1. (Tree Physiology) I.

A study of the processes occurring in trees and their relation to the complex of activities constituting plant growth. Topics include basic considerations of

anatomy and physiology of roots, stems and leaves. Absorption, transpiration, internal water relations, food synthesis, digestion, translocation and growth receive appropriate elementary treatment.

1 class hour and 2 2-hour laboratory periods a week.

Credit, 3.
PROFESSOR KOZLOWSKI.

BOTANY S-2. (Diseases of Trees and Shrubs) II.

A survey course dealing with the cause, nature, and general procedures of plant disease control. The profound influence environment exerts on plant disease, the role played by insects in their transmission and the major classes of plant pathogens, fungi, viruses and bacteria are briefly considered.

3 class hours a week.

Credit, 3.
ASSISTANT PROFESSOR BANFIELD.

BUSINESS ENGLISH S-1 and S-2. I. II.

This course is designed to cover review work in the fundamentals of grammar and composition, and to give students training and practice in writing various types of business letters and reports.

3 class hours a week.

Credit, 3.
MRS. DUBOIS.

BUSINESS ENGLISH S-3. (Report Writing) I.

A discussion and writing course concerned with planning and setting up the different kinds of reports necessary in many occupations.

3 class hours a week.

Credit, 3.
MRS. DUBOIS.

BUSINESS MANAGEMENT S-2. II.

This course is designed primarily for students majoring in Floriculture. It involves a study of records and accounts used by florists; costs and prices; uses of capital and credit; house and store management; advertising; buying and selling; economic use of labor and equipment; general business trends as affecting the flower business; how the florist should make adjustments to meet economic changes; analyses of going concerns; and finally a bringing together of all information studied and applying it to the successful organization of a business. The entire course is to be made as applicable and practical as possible.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
PROFESSOR LINDSEY.

BUSINESS MANAGEMENT S-3. I.

This course is designed primarily for students majoring in Dairy Industry. The principles of business organization and management are considered in relation to the successful operation of a dairy plant. The course includes a study of the following: various records and accounts used by dairies; costs and prices; uses of capital and credit; economic trends as affecting the business; how to make adjustments in the business to meet economic changes; analyses of different types of going concerns; and finally a bringing together of all the information studied and applying it to the successful organization of a business.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
PROFESSOR LINDSEY.

ENTOMOLOGY S-2. (Insect and Related Pests of Florists' Crops) II.

Course material is designed to provide a comprehensive study of insect pests of greenhouse and garden plants primarily for Floriculture majors. It is devoted

to an understanding of the nature of the pests encountered; types of damage, life histories, associations with environment, and the more important aspects of their control.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
MR. WEIDHAAS.

ENTOMOLOGY S-4. (Insect and Related Pests of Shade and Ornamental Trees and Shrubs) II.

Course material, designed primarily for freshmen in Horticulture and Arboriculture, is devoted to an introduction to Entomology and a study of major pest species; their recognition, damage, and development. The course is a basis for further study of pests and the use of control measures which is taken up on Entomology S-5. A summer collection of important pests may be required.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
MR. WEIDHAAS.

ENTOMOLOGY S-5. (Control of Insect and Related Pests of Shade and Ornamental Trees and Shrubs) I.

This course is designed for seniors in Horticulture and Arboriculture who have completed Entomology S-4. It is devoted to a continued study of major pests; their damage, life histories, environment, and distribution and to an understanding of the principles and practical methods of controlling those pests. Summer collections will be classified and studied during laboratory periods.

1 class hour and 2 2-hour laboratory periods a week

Credit, 3.
MR. WEIDHAAS.

ENTOMOLOGY S-6. (Turf Insects) II.

A course designed to acquaint the student with the principal pests of turf. General introduction to Entomology, followed by study of specific pests of turf.

1 class hour and 1 2-hour laboratory period a week

Credit, 2.
ASSISTANT PROFESSOR HANSON.

FARM MANAGEMENT S-1 and S-2. (Farm Management and Accounts) I. II.

The work in this course involves a study of farm records and accounts; costs and prices of farm products; uses of capital and credit; types of farming, selection of crop and live stock enterprises; size, diversity and production as related to the successful farm business; farm layout and arrangement; economic use of labor, power and equipment; detailed analysis of both successful and unsuccessful farms, how the farmer should make adjustments to meet economic changes; and finally, a bringing together of the information gained and applying it to the successful organization of a farm business.

Actual farm records are used to illustrate the above points. The entire course is made as applicable and practical as possible.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
PROFESSOR BARRETT.

Note. — Farm Management will be given both semesters. The first semester will be for students majoring in Animal Husbandry; the second semester for students majoring in Poultry Husbandry, Fruit Growing and Vegetable Growing.

FARM MANAGEMENT S-3. (Efficiency in Farming Operations) I.

For Freshmen. This is an introductory course to the regular Farm Management work which comes in the second year. It is in no sense a theoretical consideration but rather a study of the practical aspects of the efficiency of the many day-to-day jobs found on various types of farms. In brief, a careful anal-

ysis is made of the "one best way" of doing the jobs. The course involves a study of farm layout, building layout, economical use of machinery and equipment, and efficiency in hand operations. The primary objective is to point out ways of reducing farm labor costs. Motion pictures will be used to illustrate good methods versus poor or inefficient methods.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
PROFESSOR BARRETT.

FOOD TECHNOLOGY S-2. (Basic Principles, Freezing, Canning and Pickling) II.

Principles of food preservation including refrigeration and modern locker storage management are covered. Work is given in the use of packaging materials and the examination and grading of food products. Three field trips will be required. Estimated cost \$10.00.

Note: This is a full semester course for Freshman Food Management and Senior Vegetable Growing majors; one-half semester course for Freshman Dairy Industry majors.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
MR. WESTCOTT.

FOOD TECHNOLOGY S-4. (Special Products) II.

The class and laboratory exercises in this course are planned to meet the needs of students majoring in Dairy Industry. General principles of food preservation and their application to the subject of dairying are discussed in class exercises. Crushed fruits, fruit juices, syrups, flavored syrups and other products which are utilized in the dairy trade are manufactured and tested.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
ASSOCIATE PROFESSOR LEVINE.

FORESTRY S-3. (Farm Forestry) I.

A course designed to give in one semester a working knowledge of the treatment of farm woodlands. Methods of determining the volume and value of standing timber are practiced in the first half of the course; this is followed by practice in the application of silvicultural intermediate cuttings.

2 class hours and 1 4-hour field period a week.

Credit, 4.
MR. GANLEY.

PRACTICAL SCIENCE S-7 and S-8. I. II.

This is a course in applied sciences, chiefly in the fields of chemistry and physics, as they are tools serving the needs of the food and dairy industries. In general, the course is designed to give an introduction to scientific thought and phenomena by means of lectures, textbook study and classroom demonstrations. The emphasis is entirely built around the practical problems in the student's field of work. Practical Science S-8 is a full semester course for Food Management majors.

2 class hours and 1 2-hour laboratory period a week.

Credit, 3.
ASSISTANT PROFESSOR EVERSON.

PUBLIC SPEAKING S-1 and S-2. I. II.

The aim of the course is to give the student confidence in himself while speaking before groups, and to have him acquire some knowledge of, and practice in, the more practical types of public speaking.

1 class hour a week.

Credit, 1.
MR. PEIRCE.

VETERINARY SCIENCE S-1. (Animal Sanitary Science) I.

Sections for Animal Husbandry, Dairy Industry, and Poultry Husbandry Major students. Conservation of the health of animals is the keystone of successful animal husbandry. This course acquaints students with the essentials upon which the health of animals depends. In order that students may later guard the animals in their charge, attention is given to conditions favoring communicable and non-communicable diseases, and to preventive measures.

3 class hours a week.

Credit, 3.

PROFESSOR BULLIS AND PROFESSOR SMITH.

VETERINARY SCIENCE S-2. (Applied Animal Sanitary Science) II.

A continuation of S-1. The Animal Husbandry section will study the more common diseases of cattle, horses, sheep, and swine, and the Poultry Husbandry section will study poultry diseases. Causes; development; control; eradication; and preventive measures will be emphasized.

3 class hours a week.

Credit, 3.

PROFESSOR BULLIS AND PROFESSOR SMITH.

SHORT COURSES AT THE UNIVERSITY OF MASSACHUSETTS

Short courses are based on the idea that the motive which inspires study is the most significant factor in study itself, and that this motive rises when the student himself realizes he faces a problem that calls for a solution. Therefore there is no age limit. Enrolled in short courses are the young and the old, the experienced and the inexperienced, the theoretical and the practical. In this grouping there is a value, since students learn from each other as well as from the instructors. Practically all Short Course students intend to make a direct application of the knowledge given. Hence the aim of Short Course work is to offer the largest amount of information and training in agricultural and horticultural lines in the shortest possible time. During the past thirty years Short Courses have served thousands of students in this Commonwealth, and the demand for these courses since the war has increased greatly due to both veteran and non-veteran demand.

DIRECTORY OF INFORMATION

A. The University

Those desiring University catalogs and other pamphlets giving full information relative to entrance requirements, courses of study, expenses, opportunities for student labor, and so forth, and those with questions regarding admission to the university, either to the freshman class or to advanced standing should address Marshall O. Lanphear, Registrar of the University, Amherst, Mass.

B. The Graduate School

Questions relating to courses offered leading to the degrees of Master of Science and Doctor of Philosophy, admission and work required, should be addressed to Gilbert L. Woodside, Director of the Graduate School, Amherst, Mass.

C. Short Courses

For information concerning the Short Course Units, the Stockbridge School of Agriculture, write or apply to Roland H. Verbeck, Director of Short Courses, Amherst, Mass.

APPLICATION FOR ENROLMENT IN THE STOCKBRIDGE SCHOOL OF AGRICULTURE

Name Date
 City or
 Town Street State

Present Occupation Age
 School or College Attended:

Name of School Years in High School? Graduate?

Place Are you a Veteran trainee?

Indicate by a check mark the course in which you desire to register. Do not check more than one.

- | | |
|---|---|
| 1. Animal Husbandry (Dairy Farming) | 7. Food Management (For Hotel and Restaurant Trade) |
| 2. Dairy Industry (Dairy Plant Operation) | 8. Forestry |
| 3. Poultry Husbandry | 9. Fruit Growing |
| 4. Arboriculture | 10. Ornamental Horticulture (Landscape Gardening) |
| 5. Commercial Vegetable Growing | 11. Turf Maintenance |
| 6. Floriculture | |

References. — I am personally acquainted with the above applicant, and know to be of good moral character, industrious, studious, and physically capable.

1. Name Position

Address

2. Name Position

Address

(Two references are required, and should not be members of your own family. Your teacher, your neighbor, or a former employer, are desirable. These persons should sign the application themselves.)

Mail this blank to ROLAND H. VERBECK, Director of Short Courses
 UNIVERSITY OF MASSACHUSETTS, AMHERST, MASS.

Important.—Be sure to file citizenship certificate if State tuition rate is claimed.

FORM II

CERTIFICATE OF CITIZENSHIP

The University of Massachusetts charges a tuition fee of \$200 a semester to students who are not residents of Massachusetts. In order to satisfy the university authorities that an applicant is entitled to state tuition of \$50 a semester, they require a statement signed by the clerk of the city or town in which the applicant resides, certifying to the fact that the parent or guardian of the applicant is a legal resident of said city or town. Where the guardian is certifying to this statement, it will be necessary for him to furnish copies of his appointment by the court. Such a statement may be made on the form below. If this is not presented when the student registers, the Treasurer has no option but to collect tuition on the above basis. When requesting the City Clerk to sign this certificate, an applicant for admission to the university should give the name and address of the parent or legal guardian unless he himself is of legal age.

This is to certify that I am the father.....mother.....legal guardian.....

of
 Student's Name

Signed

This is to certify that on the date specified below (Insert name of parent or guardian)

..... is a legal resident of.....
 Parent's Name

....., Massachusetts.
 Town or City

Signed
 Town or City Clerk

Date
 Seal

Mail this blank to ROLAND H. VERBECK, Director of Short Courses

UNIVERSITY OF MASSACHUSETTS, AMHERST, MASS.

This certificate must be filed with application blank if lower tuition rate for citizens of Massachusetts is to be secured.

GRADUATES—1953

George Paul Achille	Hingham, Massachusetts
Joseph Walter Adams	North Sudbury, Massachusetts
Paul Robert Anderson	Fitchburg, Massachusetts
George John Andruk	Bridgewater, Massachusetts
Guy Wellman Badger	Auburn, Massachusetts
Harry Whitney Baldwin	Sudbury, Massachusetts
Bruce Edwin Benson	Lenox, Massachusetts
Robert Joseph Beraudo	Winthrop, Massachusetts
Kenneth Bruce Bonney	Auburndale, Massachusetts
Paul Honore Bouchard	Springfield, Massachusetts
Stanley Lincoln Brown	Florida, Massachusetts
Wooster Barker Buckingham	Sheffield, Massachusetts
Jean Elizabeth Carlson	Scituate Center, Massachusetts
Kenneth Lennart Carlson	Worcester, Massachusetts
Richard Lawrence Carroll	Belmont, Massachusetts
Robert Gordon Carson, Jr.	Gardner, Massachusetts
Edgar Yves Chabot	Fitchburg, Massachusetts
Roland Ernest Chaput	Stoneham, Massachusetts
Richard Earl Cluff	Tewksbury, Massachusetts
John Anthony Collins	Syracuse, New York
James Joseph Crowley	Springfield, Massachusetts
Donald Allan Dearden	North Andover, Massachusetts
Joseph Sebastian DiCarlo	North Lakeville, Massachusetts
Charles Edwin Dinsmore	Berlin, Massachusetts
Clarence Eastman Doane, Jr.	Milton, Massachusetts
Leo Francis Doble, Jr.	Dorchester, Massachusetts
Francis William Dorsey, Jr.	Fall River, Massachusetts
Richard Warren Eaton	Waltham, Massachusetts
John Peter Elliott	Osterville, Massachusetts
Roland John Ferguson	East Wareham, Massachusetts
Robert Joseph Frederico	Grafton, Massachusetts
David Venner Freeman	Dorchester, Massachusetts
Joseph Anthony Freitas	Plymouth, Massachusetts
Donald Lewis Gardner	Amherst, Massachusetts
Kenneth Glenn Gareri	Worcester, Massachusetts
Leo William Gavin	Boston, Massachusetts
Robert Charles Gosselin	Chicopee, Massachusetts
John William Gresh	Unionville, Connecticut
Peter Lambert Groff	Mill River, Massachusetts
Frederick Allen Gummow	West Bridgewater, Massachusetts
Herman Craswell Haley	Milton, Massachusetts
George Kendall Haller	West Boylston, Massachusetts
Alan Jordan Havens	Holden, Massachusetts
David Edson Hawes	North Sudbury, Massachusetts
Edward Charles Hempel, III	Westfield, Massachusetts
James Russell Henry	Leominster, Massachusetts
Lawrence Donald Herron	Leyden, Massachusetts
Roger Donald Hines	Bolton, Massachusetts
Donald Leslie Hooper	Holden, Massachusetts
Robert Edward Horte	Whitman, Massachusetts

Paul George Jasmin	Chelmsford, Massachusetts
Louis John Jussaume	East Douglas, Massachusetts
Henry Frank Kabat	Hatfield, Massachusetts
Albert Theodore Karlson	Orange, Massachusetts
Paul Albin Kasparson	Worcester, Massachusetts
Robert Glenn Korpinen	Worcester, Massachusetts
Wilfred Davis Lamb, Jr.	Lancaster, Massachusetts
Thomas Michael Leahey	Lee, Massachusetts
Roger Nelson Lopez	Northfield, Massachusetts
John Stanley Malinoski	Amherst, Massachusetts
Edward Francis Maney, Jr.	Peabody, Massachusetts
Frank James Martines	Bedford, Massachusetts
Lewis Ralph Mason, Jr.	South Easton, Massachusetts
Donald Francis Mead	Arlington, Massachusetts
Arthur Malcolm Mudgett	Sterling Junction, Massachusetts
Thomas Paul McGrath	Beverly, Massachusetts
Alexander Henry McVeigh, Jr.	Ludlow, Massachusetts
Charles Ralph Niethold	Sharon, Massachusetts
Edward Gordon Parsons	Northfield, Massachusetts
Thomas Kenney Porter, Jr.	Somerset, Massachusetts
Henry Frank Radomski	South Portland, Maine
Lawrence Martin Rogers	Mendon, Massachusetts
Roland Barker Shaw	New Bedford, Massachusetts
Donald Anthony Smiaroski	Deerfield, Massachusetts
Philip John Stevens	Charlton, Massachusetts
Thomas Coleman Warren, Jr.	Melrose, Massachusetts
Howard Leslie Waterman, Jr.	Halifax, Massachusetts
Neil Ames Welch	Vineyard Haven, Massachusetts
Lawrence Walter Werner	East Milton, Massachusetts
George Dana Wood	Needham, Massachusetts
Donald Allen Young	South Hadley, Massachusetts
Edwin Ralph Young, Jr.	Worcester, Massachusetts
Willard Henry Young, Jr.	Belchertown, Massachusetts

AS OF THE CLASS OF 1952

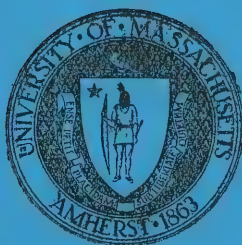
Joseph Michael Drelick	Haverhill, Massachusetts
Howard Winslow Dunnells	Melrose, Massachusetts
Howard Wentworth Hunter	Waltham, Massachusetts
*Paul James McCarran	New Bedford, Massachusetts

ONE YEAR CERTIFICATES

Richard Edward Abbott	Whitman, Massachusetts
Thomas Linwood Pierce	Salem, Massachusetts
Robert William White	Northampton, Massachusetts

THE UNIVERSITY OF MASSACHUSETTS

BULLETIN

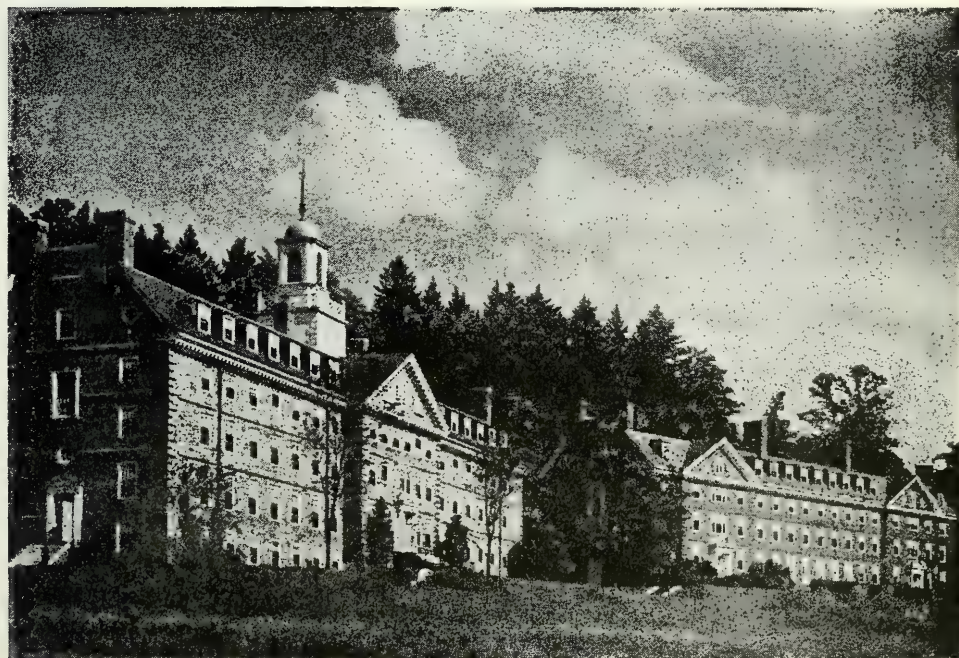


Annual Undergraduate Catalogue

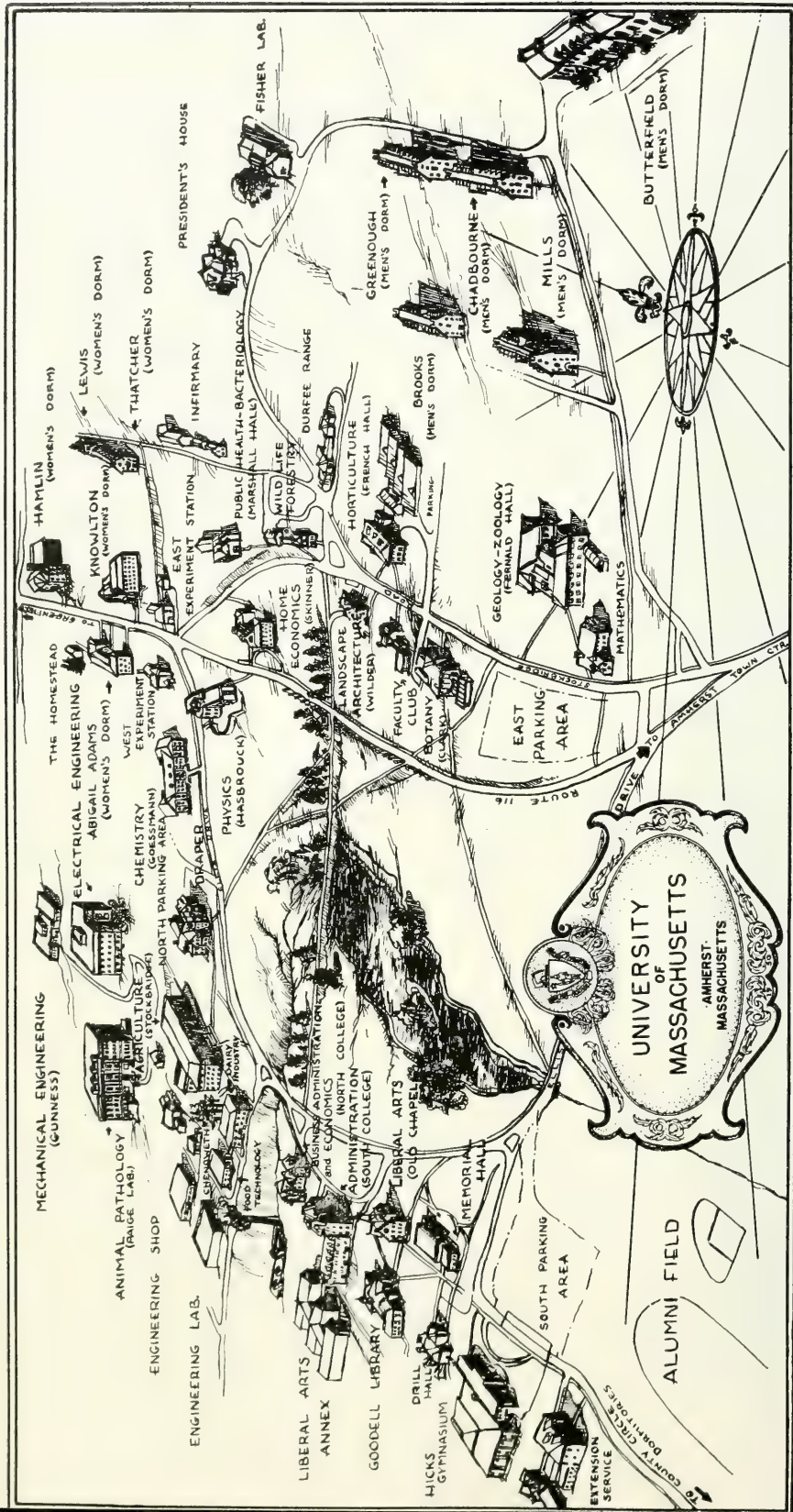
UNDERGRADUATE
SCHOOLS - 1954-55



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LEWIS AND THATCHER DORMITORIES FOR MEN



MAP OF STATE UNIVERSITY CAMPUS NEAR GEOGRAPHIC CENTER OF MASSACHUSETTS

Bulletin
**UNIVERSITY
OF
MASSACHUSETTS**

CATALOGUE OF THE UNIVERSITY

1954-1955



AMHERST, MASSACHUSETTS

VOLUME XLVI

FEBRUARY, 1954

NUMBER 2

Published six times a year by the University of Massachusetts, January, February, April (two), May, September.

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**PUBLICATION OF THIS DOCUMENT APPROVED BY
GEORGE J. CRONIN, STATE PURCHASING AGENT**

CALENDAR

1954

SEPTEMBER

- 16-20 — Friday through Tuesday. Freshman Orientation.
19 — Monday. Registration of sophomore, junior, senior and graduate students.
20 — Tuesday. Registration of freshman students.
21 — Wednesday, 8 a.m. Classes begin.
22 — Thursday, 10:45 a.m. All University Convocation.

OCTOBER

- 12 — Wednesday. Columbus Day. No University exercises.

NOVEMBER

- 11 — Friday. Armistice Day. No University exercises.
23-28 — Wednesday, 12 noon to Monday, 8 a.m. Holiday recess.

DECEMBER

- 17 — Saturday, 12 noon to January 3, Tuesday, 8 a.m. Holiday recess.

1955

JANUARY

- 19 — Thursday, 5 p.m. Classes stop.
20 — Friday. Registration of sophomore, Junior, senior and graduate students.
21 — Saturday. Registration of freshmen students.
23 — Monday to February 1, Wednesday. Examinations.

FEBRUARY

- 6 — Monday, 8 a.m. Second semester begins.
22 — Wednesday. Washington's Birthday. No University exercises.

MARCH

- 24 — Saturday, 12 noon to April 2, Monday, 8 a.m. Spring recess.

APRIL

- 19 — Thursday, Patriot's Day. No University exercises.

MAY

- 19 — Saturday, 12 noon. Classes stop.
21 — Monday to May 31, Thursday. Final examinations.
30 — Wednesday. Memorial day. No University exercises.

JUNE

- 1-3 — Friday to Sunday. Commencement.

FOREWORD

This Catalogue of the University presents announcements concerning courses, admission, etc., for the sessions of 1954-1955.

The University reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

The University Catalogue for the sessions 1954-1955 is part of the Ninetieth Annual Report of the University of Massachusetts and as such is part II of Public Document 31. Sec. 8, Chapter 75, of the General Laws of Massachusetts.

UNIVERSITY OF MASSACHUSETTS

The University of Massachusetts is the state university of the Commonwealth, founded under provisions of the Morrill Land Grant Act of Congress of 1862.

THE UNIVERSITY CAMPUS

The University of Massachusetts is located near the geographical center of the state at Amherst. This town of about 7,000 overlooks one of the most picturesque sections of the Connecticut River Valley. The valley is noted both for its scenic beauty and its educational institutions. The setting for the University, therefore, is ideal. The surrounding country is a rich agricultural region providing an excellent outdoor laboratory for the work in Agriculture and Horticulture as well as for the Biological Sciences and Geology. Those interested in other Sciences and Liberal Arts study under equally favorable conditions both because of the facilities at the University and its location in this educational area of the valley.

Amherst is eighty-seven miles from Boston and may be reached by bus connections from Northampton, Greenfield, Springfield, and Worcester. The campus consists of a tract of approximately seven hundred acres, lying about a mile north of the village center. In addition, the University owns one area of 755 acres six miles north of the campus on Mt. Toby and has recently been given another tract of 1200 acres of readily accessible forest land on Mt. Lincoln several miles to the east of the campus. These holdings are administered by the Department of Forestry and are used in instruction as demonstration forests.

The University also operates a horticultural field station at Waltham and a cranberry field station at East Wareham.

FUNCTIONS OF THE UNIVERSITY

The University of Massachusetts now serves the Commonwealth in the three important fields of resident instruction, research, and extension. Since all three services are organized on the campus, students have the advantages that come from contact with persons carrying education to the state at large, with others conducting original investigation as well as those engaged in formal instruction.

RESIDENT INSTRUCTION

DEGREE COURSES

THE UNDERGRADUATE COLLEGE. The University offers four-year undergraduate instruction leading to the following degrees: Bachelor of Science, Bachelor of Arts, Bachelor of Science in Agricultural, Chemical, Civil, Electrical and Mechanical Engineering, Bachelor of Business Administration and Bachelor of Vocational Agriculture.

This instruction is assigned to the College of Arts and Sciences, the Schools of Agriculture and Horticulture, Business Administration, Engineering, Home Economics, Nursing and to the Division of Physical Education. The aim of the four-year course is to give as high a degree of proficiency in some particular branch of learning as is possible without sacrificing the breadth, knowledge, and training which should characterize a well-rounded college education.

The degree of Bachelor of Science is conferred upon those candidates who complete the curriculum requirements of the freshman and sophomore years, and 60 junior-senior credits including the specialization requirements in a particular biological or physical science department of the College of Arts and Sciences. The Bachelor of Sciences degree is awarded also to students who complete the curriculum requirements of the Schools of Agriculture and Horticulture, Home Economics, Nursing, and the Division of Physical Education for men. This degree may also be granted to students majoring in Education or Psychology who complete a minimum of 15 junior-senior credits in science departments of the College.

The degree of Bachelor of Arts is awarded to all candidates who complete the curriculum requirements of the freshman and sophomore years in the College of Arts and Sciences and 60 junior-senior credits including the specialization requirements of a liberal arts department in the College. This degree may be awarded also to majors in a biological or physical science department who select a minimum of 18 junior-senior credits in liberal arts departments of the College.

All graduates from the School of Engineering will receive the appropriate degrees of Bachelor of Science in Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering or Agricultural Engineering.

All graduates from the School of Business Administration will receive the degree of Bachelor of Business Administration.

Special arrangements are made for some graduates of county agricultural schools and of agricultural departments of certain high schools to complete the college course with majors in agriculture or horticulture. Upon the completion of their course they will be granted a Bachelor of Vocational Agriculture degree.

GRADUATE SCHOOL

THE GRADUATE SCHOOL.—Graduate courses leading to the Doctor of Philosophy degree may be taken in the following fields: Agronomy, Bacteriology, Botany, Chemistry, Economics, Entomology, Food Science, and Food Technology.

The following departments offer major work leading to a Master's degree: Agricultural Economics, Agronomy, Animal Husbandry, Bacteriology, Botany, Chemistry, Civil Engineering, Dairy Industry, Economics, Education, Electrical Engineering, English, Entomology, Floriculture, Food Technology, Geology and Mineralogy, History, Home Economics, Landscape Architecture, Mathematics, Mechanical Engineering, Olericulture, Philosophy, Physical Education for Men, Pomology, Poultry Science, Psychology, Public Health, Romance Languages, Wildlife Management, Zoology.

The degree of Master of Landscape Architecture is granted to students completing the two years' graduate work offered by the Department of Landscape Architecture; while students taking the equivalent of one year's graduate work in that major may be granted the degree of Bachelor of Landscape Architecture.

Several other departments in the University, while not regularly organized for major work in the Graduate School, do, nevertheless, offer courses which may be selected for minor credit. These are: Forestry, Physics, and Veterinary Science.

The general requirements of the Graduate School regarding admission, residence, credits, tuition, etc., together with specific information concerning details of interest to prospective students, are outlined in a separate bulletin, which may be obtained upon request from the Dean of the Graduate School.

SUMMER SCHOOL

THE SUMMER SCHOOL. A Summer Session is available for those desiring to accelerate their program. This Summer Session is planned to serve the needs of (1) all students enrolled as candidates for a degree at any college, (2) persons desiring refresher or professional improvement courses, (3) graduate students desirous of meeting specific requirements in certain fields, and (4) any adult person who finds courses suited to his preparation and needs. Applications for the Summer School may be obtained by writing to the Director of the Summer Session.

NON-DEGREE SHORT COURSES

The University, through its Short Course division, as a special service under the Land-Grant Act by which it was established, provides a complete program of two-year technical and vocational courses in the fields of agriculture and

horticulture. These train for all types of commercial farming operations as practiced in New England.

Other short courses, varying in length from one to ten weeks, furnish supplementary training for city and town sanitary inspectors, tree wardens and city foresters, golf course greenkeepers, and skilled workers in dairy and ice cream plants.

THE STOCKBRIDGE SCHOOL OF AGRICULTURE. This School was organized at the University in 1918 under the name of "The Two Year Course in Practical Agriculture." Its purpose was to meet the demand for shorter courses in agriculture which might be taken by high school graduates who could not satisfy college entrance requirements or who, for one reason or another, were unable to take the four year college course. In 1928 the School was given its present name in honor of Levi Stockbridge, first professor of agriculture at the University and its fifth president.

This program trains men and women primarily for the practice of farming or associated agricultural industries. Graduation from the School does not fulfill the requirements for entrance into the degree course, nor are credits earned during the course regularly transferable toward credit for a degree. A diploma is awarded for satisfactory completion of any two-year course; for other short courses certificates are presented.

As the two-year program is now organized a student may choose any one of eleven vocational courses including dairy farming, dairy manufactures or milk plant operation; poultry farming, arboriculture or the care of trees; fine turf maintenance for golf courses, cemeteries, park, and play-grounds; commercial flower growing, both retail and wholesale; food management for clubs, hotels, and restaurants; commercial fruit farming, ornamental horticulture or landscape gardening; commercial vegetable farming, and applied forestry for timber growing and forest products industries.

On-the-job placement training is required of all first year students in the second semester for a period of four to seven months, depending on type of employment. No student can earn a diploma of graduation without this applied training experience. Wages earned can pay a large part of second year expenses if the student is forced to economize.

Limited enrollment quotas in each major course make necessary early filing of application. No formal entrance examinations are required for non-degree short courses.

A catalog, giving complete description of all two-year courses offered in The Stockbridge School of Agriculture, as well as full details on estimated costs, employment opportunities in each field, and entrance arrangements is available. Application form is printed in the catalog. Write to Director of

Short Courses, University of Massachusetts, Amherst, Massachusetts.

NOTE: (For interview or personal conference the Short Course Office is open Monday through Friday from 8:30 to 12:00 and 1:00 to 5:00, state and national holidays excepted.)

RESEARCH AND REGULATORY SERVICES

The University of Massachusetts serves the fields of agriculture and horticulture through its Experiment Station, which provides research and regulatory services. Experiment stations were established in all states as the need of development of practical information on subjects relating to agriculture became apparent. Through the efforts of experiment stations a fund of scientific knowledge applicable to agriculture and horticulture has been accumulated, and research workers in the experiment stations continue to contribute to this knowledge by constant research and experimentation.

At the University of Massachusetts, the Experiment Station service has expanded until it now deals with problems in the following fields of specialization: Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Bacteriology, Botany, Chemistry, Dairy Industry, Economics, Engineering, Entomology, Horticulture, Floriculture, Food Technology, Nutrition, Olericulture, Pomology, Poultry Science, and Veterinary Science. Most of the research activities of the University of Massachusetts are undertaken at the main Experiment Station at Amherst. There are, however, two substations, one at Waltham, devoted largely to the problems of horticulture as applied to olericulture, floriculture, and nursery culture, and one at East Wareham, where attempts are in progress to solve the problems of the cranberry and blueberry growers.

In addition to the work described above, the administration of certain regulatory services, as pertaining to the sale of feeds, fertilizers, and seeds and to the use of dairy glassware, is also assigned to the Experiment Station which is equipped with the necessary laboratory facilities and personnel for that purpose.

EXTENSION SERVICE

The Massachusetts Extension Service is a cooperative teaching effort between the United States Department of Agriculture, the University of Massachusetts and the several counties of the State. The work of the Extension Service is carried on through unified teaching programs in all parts of Massachusetts. The Extension Service assists the people of the farm, the home, and the rural communities to improve agriculture, home making, and rural life. The University of Massachusetts is the State Extension Service headquarters.

Extension educational teaching plans are made in council with the people who determine their problems and help to suggest methods and practices for their solution.

The Extension effort was brought about by the Smith-Lever Law, passed by Congress on May 8, 1914. Since that time, the service has grown to a staff of over 100 State and County workers who conduct an educational program in all phases of agriculture and home-making among the adults and young people (4-H Club work) of the State. All types of methods, including subject matter, meetings, demonstrations, farm and home visits, publications, visual aid, and radio are used in carrying out this educational program directly in the farm and rural areas of the State. During the war emergency, the Extension Service extended its home food production and preservation program to the urban areas.

BUILDINGS and EQUIPMENT

The campus is laid out in the form of an oval attractively set off by the College Pond in the center. Around this oval are grouped the main buildings of the University. Those using the attached map of the campus are advised to start at South College, the Administration Building, and proceed in the order indicated below.

SOUTH COLLEGE.—Here are located the administrative offices including those of the President, Provost, Registrar, Treasurer, Secretary, Director of Placement Service, the Dean of Women, and the Dean of Men. Erected 1885.

NORTH COLLEGE.—The University Store, offices and classrooms of the School of Business Administration and the Department of Economics. Erected 1868.

FARLEY 4-H CLUB BUILDING AND BOWDITCH LODGE.—Headquarters for 4-H Club Activities. Erected 1933 and 1936 respectively by funds contributed by 4-H Club members and interested friends and organizations. The former was named to honor George L. Farley for twenty-five years State Leader of County Club Agents; the latter for Nathaniel Bowditch, Trustee of the University from 1896-1945.

POWER PLANT.—General Maintenance.

UNIVERSITY FARM.—In the University barns are maintained Percheron and Morgan horses; Aberdeen-Angus, Ayrshire, Guernsey, Hereford, Jersey and Holstein cattle; Shropshire and South-down sheep; and Chester White swine. The university farm is operated as a livestock farm, producing all its necessary roughage in the form of pastures, hay and silage and a portion of its required grain.

LIBERAL ARTS BUILDING.—Classrooms, laboratories and offices for Foreign Languages, Psychology and Education. Erected 1947.

GRINNELL ARENA AND ABATTOIR.—Erected in 1910 primarily for livestock judging. An abattoir was constructed in 1930 as an addition to the original building. Named in honor of James S. Grinnell, for twenty-two years a trustee of the University.

FLINT LABORATORY.—Laboratories and classrooms for Dairy Industry. Erected in 1911 and named for Charles L. Flint, fourth president of the University.

STOCKBRIDGE HALL.—Departments of Agricultural Economics and Farm Management, Agronomy, Animal Husbandry and Poultry Husbandry. Erected in 1914 and named for Levi Stockbridge, first Professor of Agriculture and a former

President of the University. Bowker Auditorium, the main auditorium of the University, is located here. It is named for William H. Bowker, a member of the first graduating class, trustee of the University, and one of the pioneers in the fertilizer industry.

CHENOWETH LABORATORY.—Classrooms and laboratories including Commercial Practices Laboratory for the Department of Food Technology. Erected 1929 and named in honor of Walter W. Chenoweth, pioneer in the field of Food Technology and first Head of the Department.

DRAMATIC WORKSHOP.—A headquarters for instruction in stagecraft.

HATCH LABORATORY.—A laboratory where small animals and chickens are used in connection with investigations into human, animal, and poultry nutrition.

ENGINEERING ANNEX.—Laboratories, classrooms, and offices for the School of Engineering. Erected 1948.

ENGINEERING SHOP.—Laboratories and shop for machine tools, woodworking, motors, and welding instruction. Erected 1916.

POULTRY PLANT.—Consisting of a number of modern buildings in which instruction and research in ventilation, breeding, feeding, incubation, brooding, marketing and management of poultry and poultry enterprises take place. Rhode Island Reds, Barred Plymouth Rocks, White Plymouth Rocks, New Hampshires, and S.C. White Leghorns and several other breeds are maintained here on a commercial basis.

PAIGE LABORATORY.—Erected in 1950 and named in honor of James B. Paige, a graduate of the College in 1882 and Professor of Veterinary Science from 1891-1922. The building contains classrooms and laboratories. Laboratories for State Control and research work in animal diseases are located here.

GUNNESS LABORATORY.—Laboratories for industrial combustion engines, materials testing, fluid mechanics, heating, air conditioning and refrigeration, electrical machinery, electrical circuits, as well as classrooms and offices for the School of Engineering. Built in 1948 and named in honor of Christian I. Gunness, Professor of Agricultural Engineering from 1914 to 1946.

ELECTRICAL ENGINEERING WING.—Completed in 1950, this portion of the proposed main Engineering building provides laboratories for Industrial Electronics, Communications, Ultra High Frequency, Electrical Measurements, Illumination and Metallurgy, as well as classrooms and offices for the School of Engineering. This structure is planned as a wing for the future main Engineering building of the University.

GOESSMANN LABORATORY.—Contains eight large laboratories, an auditorium, chemical library, and lecture rooms. The east wing of the third floor is used by the Experiment Station chemists. The remainder of the building is for resident instruction in Chemistry. Erected in 1924 and named in honor of Charles A. Goessmann, first Professor of Chemistry at the University.

WEST EXPERIMENT STATION.—The State Control Service is centralized here. Fertilizers, seeds, and feeds are analyzed or inspected in accordance with the state law. Erected 1886.

EAST EXPERIMENT STATION.—Here are located the offices of the Director of the Experiment Station and Graduate School.

CRABTREE HOUSE.—A self-liquidating dormitory housing 154 students. This building was erected under the sponsorship of the Associate Alumni and completed in 1953. Named for Lotta Crabtree, benefactress of the University.

ABIGAIL ADAMS HOUSE.—Women's dormitory accomodating 100 students. Erected in 1919 and named for Abigail Adams, wife of John Adams, second President of the United States.

THE HOMESTEAD.—Girls majoring in Home Economics receive their Home Management practice here. This is a fine old colonial homestead newly equipped with all the modern conveniences of the home.

HAMLIN HOUSE.—A self-liquidating dormitory housing 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1949. Named for Margaret P. Hamlin, first Placement Officer for Women from 1919 to 1948.

KNOWLTON HOUSE.—A self-liquidating dormitory with accomodations for 175 students. Erected under the sponsorship of the Associate Alumni and completed in 1950. Named in honor of Helen Knowlton, Associate Professor of Home Economics, 1924-1941.

LEACH HOUSE.—A self-liquidating dormitory housing 154 students. This building was erected under the sponsorship of the Associate Alumni and completed in 1953. Named in honor of Mrs. Joseph A. Leach, chairman of the Women's Advisory Council and former trustee.

LEWIS HOUSE.—Women's dormitory accommodating 150 students. A self-liquidating dormitory erected under the sponsorship of the Associate Alumni in 1940 and named in honor of Edward M. Lewis, Dean of the College 1914-25 and President 1925-27.

NEW DORMITORIES.—Two new dormitories are under construction in this area. They are self-liquidating buildings,

being constructed by the Alumni Building Association and will increase facilities for housing women students.

THATCHER HOUSE.—Women's dormitory with facilities for 150 students. Erected in 1935 and named in honor of Roscoe W. Thatcher, President of the College 1927-32.

UNIVERSITY DINING COMMONS.—A central University dining commons for men and women students. Constructed by the Commonwealth to replace Draper Hall as a central dining facility.

UNIVERSITY INFIRMARY.—A group of three buildings, one for bed patients, one for out patients and a third for contagious cases.

MARSHALL HALL.—Erected in 1915 and named for Dr. Charles Marshall, a former Professor of Bacteriology and Director of the Graduate School. The building provides laboratories and classroom space for the Department of Bacteriology and the Department of Zoology.

SKINNER HALL.—Laboratories, classrooms and offices for the School of Home Economics. Erected in 1947 and named in honor of Edna L. Skinner, first Dean of the School of Home Economics.

HASBROUCK PHYSICS LABORATORY.—Completed in 1949. Contains laboratories and lecture rooms designed for the various main divisions of Physics. Named in honor of Philip B. Hasbrouck, Professor of Physics and Registrar of the College during the period 1905 to 1924.

CONSERVATION BUILDING.—Formerly the Old Botany Museum, erected 1867. Houses laboratories, classrooms and offices for the Department of Forestry and Wildlife Management.

FISHER LABORATORY.—Erected in 1910 and named for Jabez Fisher, one of the foremost early horticulturists of the state. Laboratories for Pomology. Included are a quick freezing room, six refrigerator rooms, two rooms for the storage of frozen products, two classrooms, and three packing rooms.

WILD LIFE LABORATORY.—Laboratories for graduate students in Wild Life Management.

WILDER HALL.—Here are the classrooms, drafting rooms, and offices of the Department of Landscape Architecture. Erected in 1905 and named for Marshall P. Wilder, a pioneer in the movement for agricultural education in Massachusetts, and one of the first trustees of the College.

FRENCH HALL.—French Hall, built in 1908 and named in honor of Henry F. French, the first President of the College, houses the Departments of Floriculture, Pomology, and Olericulture. In the rear of the building is the new Durfee range of greenhouses, built in 1908 and devoted to the growing of

carnations, roses, chrysanthemums, etc. One house is maintained as a conservatory and contains a collection of plants used primarily for decorative purposes. The old Durfee range just north of French includes a collection of tropical and semi-tropical plants of botanical and horticultural importance. It was erected in 1867 from money given by Dr. Nathan Durfee of Fall River, treasurer of the board of trustees.

STOCKBRIDGE HOUSE.—Faculty Club House.

SHADE TREE LABORATORIES.—Constructed in 1948 for research on shade tree problems including Dutch Elm Disease.

CLARK HALL.—Offices, lecture rooms, laboratories, and greenhouses of the Department of Botany are located here. The herbarium contains about 40,000 sheets of seed plants and ferns, 2,500 sheets of liverworts and mosses, and a collection of 20,000 specimens of fungi. The building was erected in 1906 and named in honor of William S. Clark, President of the College and Professor of Botany from 1867 to 1879.

FERNALD HALL.—Erected in 1909 and named in honor of Professor Charles H. Fernald who served the College from 1886 to 1909, built a strong Department of Zoology, created the Department of Entomology, and acted as Director of the Graduate School. Fernald Hall houses the Departments of Entomology and Geology and offices and classrooms of the Department of Zoology. Offices and laboratories of the Western Sanitary District, Massachusetts Department of Public Health, are also located here. The Entomology collection includes over 160,000 insects. There are also Geological and Zoological museums.

MATHEMATICS BUILDING.—Classrooms and offices of the Mathematics Department.

MILLS HOUSE.—A self-liquidating dormitory for 150 students. Erected in 1948 under the sponsorship of the Associate Alumni. Named in honor of George F. Mills, teacher of English from 1899 to 1914 and Head of the Division of Humanities.

BROOKS HOUSE.—Men's self-liquidating dormitory. Named in honor of William Penn Brooks, Professor of Agriculture and Director of the Experiment Station, 1888-1921.

BUTTERFIELD HOUSE.—A self-liquidating dormitory with dining hall. Accommodates 147 students. Erected in 1941 under the sponsorship of the Associate Alumni. Named in honor of Kenyon L. Butterfield, President of the College 1906-1924.

CHADBOURNE HOUSE.—Men's dormitory for one hundred and fifty students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of Paul Ansel Chadbourne, President 1866-67 and 1882-83.

BAKER HOUSE.—Men's dormitory accommodating 360 students. A self-liquidating dormitory erected 1951 by the Alumni Building Corporation. Named in honor of Hugh P. Baker, President of the University from 1933 to 1947.

GREENOUGH HOUSE.—Men's dormitory and Dining Hall. Houses one hundred and forty-eight students. A self-liquidating dormitory erected in 1946 under the sponsorship of the Associate Alumni. Named in honor of James Carruthers Greenough, President from 1883-86.

MUNSON HALL.—Headquarters for the Massachusetts Extension Service. Named in honor of Willard A. Munson, a graduate of the College in 1905 and Director of the Extension Service from 1926 to 1951.

CURRY S. HICKS PHYSICAL EDUCATION BUILDING.—Erected in 1931 from funds contributed by Alumni and friends of the College plus an appropriation by the state legislature. Contains a large swimming pool, an exercise hall, basketball floor, and locker room. Named for Curry S. Hicks, Professor and Head of the Division of Physical Education from 1911 to 1949.

ALUMNI FIELD.—So called because both funds and labor for its construction were contributed by alumni and students. Included are a baseball diamond, football and soccer fields, and a cinder track. Ten tennis courts are adjacent to the Physical Education Building.

ATHLETIC FIELD FOR WOMEN.—A large field west of the Physical Education Building provides space for Archery, Softball, Field Hockey, and other women's activities.

COUNTY CIRCLE.—Five residence halls erected in 1948 by the Commonwealth. Hampshire and Suffolk Houses contain 30 two-room and three-room apartments for married persons and their families. Plymouth, Berkshire, and Middlesex Houses contain dormitory rooms for approximately 144 students each.

COLLEGE ARMORY.—Contains, in addition to the offices of the Department of Military Science, the offices, locker and dressing rooms, and exercise hall for the Department of Physical Education for Women.

MEMORIAL HALL.—Erected in 1921 by Alumni and friends in memory of those men of the College who died in World War I. Included is a Memorial Room in which the names of those members of the College family who died in the service of their country are appropriately enshrined. This building is a social center of student life. Alumni headquarters are here as well as the offices of student organizations including the Senate, Collegian, and Index.

OLD CHAPEL.—Erected in 1885. Auditorium, seminar room, classrooms, and offices for English and History.

GOODELL LIBRARY.—Goodell Library is named in honor of Henry Hill Goodell who served the College from 1867-1905. He was President from 1886 to 1905 and because of his deep enthusiasm for books also acted as Librarian of the College.

Goodell Library is a virtually fireproof building erected in 1935. Its plan is unique in that the book-stacks are open freely for inspection and borrowing.

The main floor includes a large reading room, a reference room, delivery desk, cataloging and administrative offices. On the second floor is another large reading room, commonly used for reserve book reading. There are also studies for faculty and students and the University of Massachusetts Memorabilia room.

Besides Goodell Library there are fifty-two departmental libraries ranging from small collections to sizable separate libraries with reading rooms and valuable collections of reference and text books.

The complete library system contains 165,000 volumes and is growing at the rate of over 4,000 volumes a year. The library regularly receives over 600 periodicals, and also the serial publications of learned societies. It is also a depository for government documents of the United States Department of Agriculture and the various State Experiment Stations.

INFORMATION CONCERNING THE UNIVERSITY COURSE

The sections of the catalogue that follow are primarily for undergraduate students in the four year degree course. Those interested in graduate study are referred to the Graduate School catalogue and in short courses to the catalogue of the Stockbridge School of Agriculture and other short course publications.

STUDENT EXPENSES

Expenses vary from approximately \$750 to \$850 per year for the normally economical student. First year costs are usually greater than those of the other three years and there is less opportunity to earn. A student is advised to have a definite plan for meeting the expenses of the first year before entering.

Freshmen entering the School of Engineering should be prepared to meet an expense of approximately \$35 for drawing equipment and a slide rule.

The following estimate of a year's expenses, based upon last year's costs, includes only those items which are strictly college and does not include amounts for clothing, laundry, travel, etc. These costs vary slightly from year to year. Tuition for residents of Massachusetts is \$100 per year and for others \$400.

	Normal
Tuition (citizens of Massachusetts)	\$100.00
Room in college dormitory or private home (ave.)	165.00
Board at University Dining Hall	430.00
Books, stationery, and other supplies	90.00
Athletic Fee	20.00
Student Tax (approx.)	18.50
	\$823.50

INITIAL PAYMENT FOR FRESHMEN

The initial payment required of freshmen at the time of fall registration is indicated below and is made up of the following items:

Tuition (citizens of Massachusetts)	\$50.00
Room rent (dormitory) approximately	82.50
Board (University Dining Hall)	165.00
Military Uniform (men students)	30.00
Athletic Fee	20.00
Student Tax (approx.)	10.00
Books, Stationery, etc.	45.00
	\$402.50

The above are only approximate figures. A bill will be rendered to the parent of each student prior to the opening of the University.

TUITION.—As a state institution the University of Massachusetts offers a low rate of tuition to all students entering from the Commonwealth. Eligibility for admission under the low residential rate is determined in accordance with the following policy established by the Board of Trustees.

A student must present evidence satisfactory to the Treasurer of the University that his domicile is in the Commonwealth of Massachusetts in order to be considered eligible to register in the University as a resident student. This means that he must have established a *bona fide* residence in the Commonwealth with the intention of continuing to maintain it as such.

The domicile of a minor shall follow that of the parents unless such minor has been emancipated. In case of emancipation the student, in addition to the requirements of these regulations, respecting residence, shall present satisfactory proof respecting emancipation. Minors under guardianship shall be required to present, in addition to the certification of the domicile of the guardian, satisfactory documentary evidence of the appointment of the guardian.

No student shall be considered to have gained residence by reason of his attendance in the University nor shall a student lose residential preference during his continuous attendance at the University.

The residence of a wife shall follow that of the husband.

The prescribed form of application for classification as to residence status must be executed by each student. Misrepresentation of facts in order to evade the payment of out-of-state tuition shall be considered sufficient cause for suspension or permanent exclusion from the University.

Discretion to adjust individual cases within the spirit of these rules is lodged with the President of the University.

BOARD.—The University provides three dining halls for students at Butterfield House, Greenough House and University Dining Commons. The dining halls at Butterfield and Greenough dormitories are intended primarily to provide for students housed in that area, including residents of Chadbourne, Mills and Brooks Houses.

All freshmen except commuters will be required to board at University dining halls on a five-day week basis.

Sophomores and juniors residing in University dormitories and other campus buildings will also be required to board at University Dining Halls except that such students who are members of fraternities or sororities may be permitted upon request to board at their respective fraternities or sororities.

Any student who wishes may board at University dining halls on the ticket plan or cash basis.

MILITARY UNIFORM.—All students taking military drill are required to make a deposit of \$30 for the uniform. A rebate of this amount is made when the uniform is returned.

STUDENT ACTIVITY TAX.—This tax, authorized by vote of the undergraduate students with the approval of the Board of Trustees, provides each student with the Collegian, the student newspaper; Index, University annual; Social Union privileges, student government, class and other activities.

ADVANCE PAYMENT

New students will be expected to make an advance payment of \$15 to the Treasurer of the University as soon as they are notified by the Registrar that they are accepted for admission. This will be considered as first payment on registration fee, which will be due at time of matriculation in September. It is not refundable and will be considered as payment for admissions and registration expense if the student does not matriculate.

A Certificate of Residence form furnished by the University must be properly filled out by the parent and the town or city clerk and returned with the \$15.00 advance payment.

WHEN PAYMENTS ARE DUE

In accordance with policy established by the Board of Trustees, all charges for tuition, fees, board, and room rent in University Dormitories are due and payable seven days prior to the date of registration of each semester. Bills will be rendered in advance and payment may best be made by mail. Students may not register until registration charges are paid.

LATE PAYMENT AND REGISTRATION

Any student who does not make payment of his semester charges within the time specified may be required to pay a fine of \$5.00. Similarly, any student who does not report for registration on the dates specified or fails to complete his registration within the prescribed time may be required to pay a late registration fee of \$5.00.

REFUNDS

Students will be granted refunds of payments made to the University in accordance with the following policy.

TUITION AND FEES

A student who leaves the University for any reason except as specified below before a semester is completed will be granted a refund of tuition and fees in accordance with the following schedule:

REGULAR TERM

- a. Within the first two weeks from the beginning of semester or term — 80 %
- b. During the third week — 60 %
- c. During the fourth week — 40 %
- d. During the fifth week — 20 %
- e. After the fifth week — no refund

SIX-WEEK SUMMER SESSION

- a. During the first week — 60 %
- b. During the second week — 20 %
- c. After the second week — no refund

A student who makes an advance payment and then for any reason does not attend any part of the next semester or term at the University will be given a full refund of tuition and fees. The \$15.00 advance payment fee required of new students is not refundable.

A student who is involuntarily called into military service before the completion of a semester will be given a pro rata refund of tuition and fees provided that he receives no academic credit for the work of that semester. If academic credit is given, there will be no refund.

ROOM RENT

It is the policy of the University that there will be no refund of prepaid room rent after the semester has commenced except in the case of a student who is involuntarily called to military service who will be granted a refund on a pro rata basis.

A student who has made an advance payment of room rent who fails to attend any part of the next semester or term or does not reside in a dormitory or other housing will be granted a full refund of prepaid room rent.

BOARD

Prepaid board will be refunded on a pro rata basis.

A student who is expelled or suspended from the University for disciplinary reasons forfeits all rights to a refund.

VETERANS' INFORMATION

Veterans who are entering the University for the first time under the old G.I. Bill (P.L. 346) must present a Certificate of Eligibility at registration. This may be obtained from your nearest Veterans Administration office. Veterans failing to obtain the Certificate of Eligibility must make payment of tuition and fees in order to register. Board and room fees must be paid in advance whether enrolled under the G.I. Bill or not.

Veterans (under P.L. 346) who are transferring to the University of Massachusetts from another institution or who have done summer work at another institution will be required

to submit a supplemental Certificate of Eligibility at registration. This may be obtained by applying through the veterans' office at the institution last attended.

Veterans entering under the new G.I. Bill (P.L. 550) must meet all expenses personally. Presentation of a Certificate of Eligibility should insure the receipt of subsistence checks from the Veterans Administration.

FINANCIAL REQUIREMENTS FOR GRADUATION OR HONORABLE DISMISSAL

Diplomas, transcripts of record, and letters of honorable dismissal will be withheld from all students who have not paid all bills and all loans due the University or all legitimate bills for room rent and board due fraternities or private individuals. All such bills due the University must be paid ten days preceding Commencement. If paid after that date and the student is otherwise eligible, he may graduate the following year.

FINANCIAL AID

Scholarships, loans, and part-time employment are available for a limited number of needy and deserving students.

AID FOR FRESHMAN YEAR.—Freshmen are eligible for scholarships and part-time employment. A freshman also becomes eligible for assistance from loan funds after satisfactorily completing one semester of academic work. Scholarship application blanks may be secured from the Registrar and should be filed by May 1. Part-time employment application forms may be obtained from the Director of Placement Service and filed after a candidate has been accepted for admission.

Because of the time required for preparation of studies, few students should plan to spend more than ten hours per week in part-time employment.

AID FOR UPPERCLASSMEN.—To become eligible for financial assistance, whether scholarship, loan, or part-time employment students must file completed financial aid application forms with the Student Aid Committee in the Placement Service office by March 1 previous to the college year for which assistance is asked.

AID FOR GRADUATES OF THE UNIVERSITY.—The Lotta M. Crabtree Agricultural Funds make available to graduates of the University of Massachusetts funds to be used for farm financing.

The purpose of loans from these funds is to assist meritorious graduates who are without means in establishing themselves in agricultural pursuits. These loans are made without interest or service charges other than the cost of title search and legal papers. They must, however, be paid

back in full amount within a reasonable length of time and there are certain restrictions on their use.

Applications for the "Lotta Agricultural Fund" should be addressed to the Trustees of the Lotta M. Crabtree Estate, 619 Washington Street, Boston, Massachusetts, or may be secured at the Placement Office at the University. Decisions regarding the granting of a loan rest entirely with the Trustees under the terms of Miss Crabtree's will.

SCHOLARSHIPS

Scholarships are awarded only to needy and deserving students of high character whose habits of life are economical and whose scholastic records are satisfactory. A limited number of these scholarships are available for entering freshmen.

Scholarships are paid in installments at the beginning of each semester in the form of a credit on the student's bill. A scholarship may be discontinued at the close of any semester.

If the scholarship student withdraws from the University, any refund of University fees or charges must first be applied to reimburse the scholarship fund for the full amount of the scholarship received by the student for the semester.

The following scholarships are available:

ALVORD DAIRY SCHOLARSHIP.—for a worthy student specializing in the study of Dairy Husbandry with the intention of becoming an investigator, teacher or special practitioner in connection with the dairy industry.

DANFORTH KEYES BANGS SCHOLARSHIP.—for the aid of industrious and deserving students.

CHI OMEGA AWARD.—The local chapter of the Chi Omega Sorority offers an annual scholarship of twenty-five dollars to that woman student majoring in the department of economics or psychology who has the highest scholastic average at the end of the first semester of the senior year.

LUCIUS CLAPP FUND.—to provide scholarships and loans to deserving students.

THE COMMONWEALTH SCHOLARSHIP.—The Commonwealth of Massachusetts annually provides twenty-five scholarships of not more than two hundred and fifty dollars for members of each of the four undergraduate classes of the University. Upperclass students may obtain application forms at the University placement office. Entering freshmen may obtain application forms at the Registrar's Office.

CLASS OF 1882 SCHOLARSHIP.—for the aid of a worthy student of the junior or senior class.

FREDERICK G. CRANE SCHOLARSHIPS.—for the aid of worthy undergraduate students, preference being given to residents of Berkshire County.

J. D. W. FRENCH SCHOLARSHIPS.—for deserving students in dairying and allied subjects; also Forestry.

HENRY GASSETT SCHOLARSHIP.—for a worthy undergraduate student.

CHARLES A. GLEASON SCHOLARSHIPS.—general scholarship for worthy students.

CHARLES H. HOOD DAIRY SCHOLARSHIPS.—An unusual grant of \$800 for two scholarships to be awarded to seniors whose ultimate object is the operation of their own dairy farms.

LOTTA SCHOLARSHIPS.—The Trustees of the Lotta Crabtree Agricultural Fund have made available a substantial sum for scholarships. These are limited to students registered in the Schools of Agriculture, Home Economics, Horticulture and some Science departments. One-fourth of the amount granted is awarded to freshmen.

MARGARET F. MOTLEY SCHOLARSHIP.—one scholarship of \$100 for an upperclass student studying Horticulture, Landscape Architecture or Floriculture.

PORTER L. NEWTON SCHOLARSHIPS.—for the aid of worthy and deserving students in the field of agriculture.

BETSEY C. PINKERTON SCHOLARSHIPS.—two general scholarships for graduates of the schools of the city of Worcester.

SEARS SCHOLARSHIPS.—The Sears Roebuck Company provides for eight scholarships of \$125.00 each which are awarded annually to deserving students in the freshman class who desire to major in Agriculture. This year the Sears Roebuck Company made similar grants to women students majoring in Home Economics.

WHITING STREET SCHOLARSHIP.—Scholarships of \$50 each for deserving students.

HELEN A. WHITTIER SCHOLARSHIP.—for a deserving woman student in art as applied to living.

There are also the following special scholarships:

COTTING MEMORIAL SCHOLARSHIP.—all college expenses of freshman year—for a woman student. Recipient of this scholarship is selected by a committee of the New England Branch of the Farm and Garden Association from among candidates proposed by State Leaders of 4-H Club work in the New England states.

WILBUR H. H. WARD SCHOLARSHIP.—Twenty-five scholarships of approximately \$100, known as the Wilbur H. H. Ward Scholarships. The Wilbur H. H. Ward Fund is administered by a Board of Trustees independent of the University. Applicants for these scholarships write to Sumner

R. Parker, who may be addressed at the University. They are available only to Hampshire County boys.

THE ISOGON AWARD.—An award by Isogon, the senior women's honorary society, to a young woman student at the end of her junior year. This award is made on the basis of character and personality, scholastic achievement, campus influence and service.

GEORGE L. FARLEY SCHOLARSHIPS.—The Massachusetts Society for Promoting Agriculture has established a scholarship in memory of George L. Farley. The income of approximately \$60 per semester is awarded to deserving 4-H Club members, men or women, recommended by the State Leader of 4-H Clubs from applications submitted to County 4-H Club Agents.

Esso 4-H SCHOLARSHIP.—Every year the Colonial Beacon Oil Company awards a scholarship of \$400.00, one-fourth of which is paid each year to a 4-H Club member enrolled in some course related to Agriculture. Selection is on the basis of need, merit, and ability. Applications should be sent to County 4-H Club Agents.

THE BORDEN COMPANY FOUNDATION.—Provides an annual Scholarship Award of \$300 to that senior student in Agriculture who has achieved the highest average grade in all college work preceding the senior year. No student whose curriculum did not include at least two courses in Dairy subjects is eligible.

ASCENSION FARM SCHOOL SCHOLARSHIPS.—The trustees of the Ascension Farm School offer annually approximately \$2400 for scholarships. These are restricted to men from Western Massachusetts who are studying in the field of Agriculture and Horticulture.

ENGINEERING ALUMNI SCHOLARSHIPS.—Provided by annual contributions from graduates and friends of the School of Engineering to provide tuition scholarships to deserving and well-qualified students pursuing work in a major field of Engineering. They are available to freshmen and upperclassmen.

NATIONAL ASSOCIATION OF THOROUGHBRED BREEDERS SCHOLARSHIP.—A substantial award granted by the National Association of Thoroughbred Breeders to a freshman who is a member or former member of the Future Farmers of America. The award is established at various other universities as well as at the University of Massachusetts. Applications should be made to the Chairman of the University Scholarships Committee.

UNITED STATES ARMY ROTC SCHOLARSHIP.—The U. S. Army Reserve Officers Training Corps provides a scholarship, renewable for three years, to a young man with a good scholastic record in secondary school who possesses

leadership qualities and can meet the physical requirements for commission as a second lieutenant in the Army Reserve. The applicant must agree to enroll in the basic course, Army ROTC, and to apply for the advanced course, ROTC.

UNITED STATES AIR FORCE ROTC SCHOLARSHIP.—The U. S. Air Force Reserve Officers Training Corps in conjunction with the Department of Physical Education offers a scholarship of \$100.00 to an entering male student. This scholarship is solely for tuition and fees and may be renewed for three additional years. It is awarded to a student who possesses leadership qualities, meets the physical standards required for commission in Air Force Reserve, has a good scholastic record in secondary school and agrees to enroll in the basic course, Air Force ROTC and to apply for the advanced course, Air Force ROTC.

UNIVERSITY SCHOLARSHIP.—A limited number of scholarships of \$100.00 or more, awarded on the basis of leadership, need, scholarship and participation in extra-curricula activities.

LOANS

Through the generosity of friends of the University, funds have been donated to provide loans for a limited number of students of the three upper classes to assist in paying tuition or other college expenses. These loans are granted, after proper consideration, to needy students of good scholarship whose habits are economical. All loans are secured by a note endorsed by a responsible party as collateral. All such loans must be paid before graduation. Upon withdrawal from the University, loans automatically become due. Interest is charged at the rate of 3% to maturity, 5% thereafter on loans from all funds except the Lotta Agricultural Fund, from which loans are made without interest. Application for loans should be made to the Student Aid Committee, Placement Service Office, South College. No loan will be granted in excess of \$200 in any one year.

If funds are available at the beginning of the second semester, loans may be made in exceptional cases to members of the Freshman class whose scholastic record is satisfactory and whose budget calculations have been upset through circumstances beyond their control.

DANFORTH KEYES BANGS FUND.—This is a gift of \$6,000 from Louisa A. Baker of Amherst, the income of which is used in aiding poor, industrious and deserving students to obtain an education in the University of Massachusetts.

LOTTA AGRICULTURAL FUND.—A limited number of loans are made to students from the income of this fund. Such loans are made without interest but only to deserving

students of high scholastic rank. This fund is administered by a Board of Trustees independent of the University although loans are made only upon the recommendation of the President of the University.

VINCENT GOLDTHWAIT MEMORIAL LOAN FUND.—A gift of \$5,000 from Dr. Joel E. Goldthwait in memory of his son. This fund is used almost entirely for students in the Stockbridge School of Agriculture.

FRANK A. WAUGH FOUNDATION.—Graduates of the Department of Landscape Architecture and friends of Professor Frank Waugh have established this fund, to be used in part for loans to deserving seniors and fifth year students of that department. Requests for loans shall be reviewed and approved by the head of the department of Landscape Architecture and submitted to the Board of Trustees of the Foundation, who shall make final decision as to granting of the loans and amounts thereof.

4-H SCHOLARSHIP AND LOAN FUND.—This fund is under the supervision of the State Leader of the 4-H Clubs and is used to aid students preparing for agricultural and home economics service.

NATIONAL PEST CONTROL ASSOCIATION LOAN FUND.—A fund established by the National Pest Control Association for needy students in the field of Entomology.

THE PLACEMENT SERVICE

The University maintains a centralized Placement Service, the function of which is to assist students to secure part-time, summer, or permanent employment and to administer the required Placement Training Program.

The University is keenly interested that each graduate has an opportunity to serve his fellow men in a socially desirable occupation consistent with his interests, abilities, aptitudes, and education. To assist students to accomplish their objectives, the following aids are available: cumulative student personnel records, occupational information, library, counselling and guidance in job hunting techniques, preparation of credentials and personal data sheets and personal interviews.

The Placement Service is the clearing center for all part-time jobs at the University. Students are assisted in obtaining part-time work during the college year and full-time work during the summer vacation. Employment is not guaranteed, but every effort is made to help those students who must work to meet their college expenses. In order to give assistance to as many needy students as possible, the Student Aid Committee has adopted the policy of limiting the maximum financial aid per student to the equivalent of board. The average earnings of students engaged in part-time work is approximately \$100.00 per year.

VETERANS' AFFAIRS

The Veterans' Coordinator is a member of the Placement Service.

Veterans enrolling for the first time under Public Law 346 must file a Certificate of Eligibility with the Placement Office prior to or at registration. All veterans should clear their affairs through the Placement Service.

HEALTH SERVICE

The Health Service is a separate administrative unit dealing with all matters directly or indirectly influencing or affecting the health of staff members, employees, students, or campus visitors.

The University endeavors to safeguard the health of all students while on the campus. Basic medical attention is provided, including preliminary diagnosis, primary treatment of injuries, and temporary care of the sick. A group of three infirmary buildings and a staff of resident physicians and resident nurses are available to perform these functions.

- (1) Physical examination by their local doctor is required of all entering freshmen, re-entering students and all students participating in athletics. Physical report forms for this examination will be mailed to each student with the bill for the first semester and must be completed and returned to the University Health Service 10 days before the opening of the semester. Evidence of a SUCCESSFUL smallpox vaccination is required.
- (2) The Student Health physicians have offices in the out-patient Infirmary Building, where they may be consulted during college hours.
- (3) The Infirmary consists of 3 buildings, one for bed patients, one for contagious cases, and one for out-patient cases, where the out-patient clinic is conducted daily by the Student Health physicians.
- (4) The students are urged to consult the resident physicians at the first sign of physical disorder, or even for minor accidents. Many severe illnesses and much lost time may be avoided by early or preventive treatment.
- (5) House calls cannot be made to dormitories, sororities, or fraternities except in the case of emergency. The University cannot assure each student that a resident physician will always be available. In such instances students are encouraged to consult a town physician, although any expense connected with such service shall be borne entirely by the student. One resident physician is on call at all times to care for emergencies beyond the scope of the nurse on duty.

- (6) No charge is made to Infirmary bed patients up to seven days in each school year; time in excess of seven days will be charged at the rate of \$4 per day. A nominal charge may be made to out-patients for miscellaneous treatments.
- (7) In addition to the fee charged as specified in paragraph 6, the following additional expenses will be charged to the patient:
 - (a) *Nurses*.—If a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.
 - (b) *Professional Service*.—If a student requires continuous medical attention by a physician, he may be required to select a town physician and become responsible for fees charged by that physician.
 - (c) *Supplies*.—Special medical supplies prescribed by a physician will be charged to the patient.
 - (d) *Laundry*.—Expenses for personal laundry incurred by students while in the infirmary will be charged to the individual student.
- (8) The Health Service recommends strongly that students participate in the blanket insurance program described in literature accompanying the initial bill rendered students each year. This program is a reimbursement insurance plan providing medical, surgical, and hospital care for both accident and illnesses at a very low cost. During the past years this plan has saved numerous patients from serious unexpected expense and the insurance payments have enabled the student to stay in school. The University has no financial interest in this and acts only as a clearing house to receive premiums, in order to give the low group rate.

PUBLICATIONS AND NEWS OFFICE

The University recognizes its obligation to provide the public with accurate information about its educational program.

Providing such information is the function of the Publications and News Office which edits the University catalogues and the school bulletin series and services communications media such as newspapers and radio stations. This is a public service program and not a publicity operation.

The Publications and News Office also supervises a Student News Bureau which affords internship training in news writing to a limited number of students.

STUDENT HOUSING

It is the policy of the Board of Trustees that freshman men and women students shall be housed in campus dormitories and be required to eat at University dining halls unless given permission to commute. Sophomore and upper-class students will also be required to live in University dormitories in so far as accommodations are available. Those who cannot be so housed will be given permission to live in fraternity or sorority houses or in private homes.

Students who are assigned to housing operated by the University, or homes approved by the University, are expected to occupy them for the entire school year and may not be released sooner except as their places are taken by suitable substitutes.

Dormitories will be open for occupancy at 1 p.m. on the day immediately preceding the opening of the University.

Students assigned to dormitory rooms will be responsible for the room rent of the entire semester. Room rent is not refundable.

Rooms are furnished except for necessary bedding and linen are cared for by the students occupying them. Each occupant is held responsible for any damage.

All student property must be removed from the rooms and the key turned in to the Treasurer's Office immediately after final examinations in June. Such property not removed by the owner will be removed by the University and stored at the owner's expense.

The general supervision of the housing conditions of all students is in charge of the Faculty Committee on Housing.

ROOMS FOR WOMEN STUDENTS.—Dormitory rooms are available for women students at Abigail Adams, Crabtree, Leach, Hamlin and Knowlton Houses and at a new dormitory to be completed by September 1954.

Under the supervision of the Dean of Women, life in each dormitory is directed by a council of student leaders, advised by a full-time Housemother, so that conditions in the residence halls are conducive to study and good living habits. Through the women's branch of the Student Government, the responsibility is put upon each student to live according to her own best standards as well as according to the standards of the group.

Freshman girls will be assigned rooms in the dormitory and will be notified of the assignment prior to the beginning of college.

Near the close of each year, upperclass women will draw numbers to determine the order in which rooms may be chosen for the coming year.

Only students living in their own homes may commute. Upperclass women may apply to the Dean of Women for permission to live in a sorority house, or to earn room and board in a private home.

ROOMS FOR MEN STUDENTS.—Dormitory rooms are available for men students at Baker House, Mills House, Greenough, Chadbourne, and Brooks Halls, Berkshire, Plymouth, and Middlesex Houses.

All first-year men students will be assigned to campus dormitories. Upperclassmen should make dormitory room reservations at the Housing Office before May 1. Those who cannot be accommodated in dormitories will be given permission to live in fraternities or private homes. Assignment of dormitory rooms will be under the supervision of the Housing Office.

ROOMS FOR MARRIED STUDENTS.—The University cannot guarantee facilities for married students; however, those married students who can be accommodated will be housed in the University Apartment Units. Assignments are under the direction of the Housing Office and all inquiries should be addressed to that office. Some students may be able to locate rooms or apartments off campus.

ADVISORY SYSTEM

In order that from the day he enrolls the freshman may have some one to whom he may go for consultation and assistance, each student is assigned to a faculty adviser at the time of registration. It is the function of this adviser to help the student in adjusting himself to the work and life of the University. Academic progress reports issued by the Provost's Office are sent to the advisers periodically, and the students are expected to report to their advisers from time to time to discuss their academic standing. The adviser also forwards reports of academic standing to the parents. Both students and parents are encouraged to consult with the adviser whenever there are problems regarding studies or personal adjustment to college life.

At the beginning of the second semester of the freshman year each student will discuss his vocational and specialization plans with his adviser. If he can decide definitely upon the department in which he wishes to specialize, and the adviser approves, the student takes his election card to the head of that department for approval. In cases where students are not ready to designate a department of specialization they continue as general majors during the sophomore year under the direction of an adviser assigned by the head of the School in which the student is enrolled. Such general majors must select their field of specialization by the end of the sophomore year.

During the junior and senior years the student is under the guidance of the head of the department in which he is majoring or an adviser assigned by him.

RELIGIOUS LIFE

The University makes an effort to provide a wholesome and stimulating spiritual atmosphere for the students by co-operating with official agencies of the three faiths most largely represented at the University.

On the campus the religious life of Catholic students is enriched by the Newman Club, of which Father David J. Power of Saint Brigid's Parish is chaplain; Jewish students may participate in services and activities at the local Hillel House, under the chaplaincy of Rabbi Louis Ruchames of Northampton; and Protestant students may join in worship and other religious activities conducted by the Student Christian Association, under the guidance of the Reverend Sydney Temple, chaplain to Protestant students.

The churches of Amherst provide not only the usual opportunities for worship and participation in church work, but special events for students. Students are particularly encouraged to attend Sunday service in the local church of their respective faiths.

ACADEMIC REGULATIONS

FRESHMAN WEEK

All members of the incoming freshman class are required to be in residence on the campus for the period known as Freshman Week. During this period an attempt will be made to orient the student. He will be given psychological and mental tests, and a physical examination. Schedules and section assignments will also be arranged. In addition there will be lectures on student activities, customs, and curricula, and a scheduled meeting with the student's adviser.

REGISTRATION

Every student must report for registration on the appointed day. All late registrants must pay a \$5.00 fine. No student will be admitted to any class until he has completed the prescribed registration procedure. Changes of courses on the registration card shall be made only by the Registrar's Office.

Any student who does not complete his registration, including payment of semester charges, on the regular registration days will be required to pay a fine of five dollars.

No course will be recorded on the permanent records of the University nor will a student receive credit for it, unless such course appears on the registration card for the semester and has been properly countersigned by the instructor.

ADDING OR DROPPING COURSES

A student may not add or drop a course except with the approval of the Registrar. A course dropped without approval will be recorded as a failure.

CHANGE OF MAJOR

A student wishing to change his major must get a Program Change Card at the Registrar's Office. This change is to be approved by the head of the Department or School in which he is now majoring and also by his new major adviser. This card, properly indorsed, must be returned to the Registrar's Office before the change receives final approval.

MARKING SYSTEM

All grading is done on a numerical basis with 60 per cent the passing grade. If a student takes the final examination and fails to pass, the instructor may report either a condition or failure (F). To remove a condition, the student will have an opportunity to take a condition examination, or he may repeat the course. A failed course must be repeated unless permission to substitute another course is granted by the Committee on Admissions and Records.

The scholastic record of each student is reported to his parents at the end of each semester. Mid-semester marks are sent to parents for the first semester only. A complete report of the scholarship record of each student during his first semester is sent to the principal of the school from which the student entered.

STANDARDS OF DEPORTMENT

The customary high standard of college men and women in honor, self-respect, and consideration for the rights of others constitutes the ideal of student deportment.

The privileges of the University may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the University, acting through its President or any administrative officer designated by him, distinctly reserves the right, not only to suspend or dismiss students, but also to name conditions under which they may remain in the institution. For example, if a student is not doing creditable work, he may not only be disciplined, but he may also be required to meet certain prescribed conditions in respect to his studies even though under the foregoing rules his status as student be not affected. The same provision applies equally to the matter of absences. According to the rules, juniors and seniors are allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet if in the judgment of the University authorities, a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary; moreover, it may be withdrawn as a punishment for misconduct.

Hazing in the sense of the punishment or humiliation of students is not permitted.

REQUIREMENTS FOR GRADUATION

At the beginning of his freshman year each student selects a school or division in which he will carry his major work. One of the fundamental objectives of all programs, however, regardless of School, is a general cultural education which should be the mark of every college graduate. With this end in view all candidates for the B.S. or A.B. degree must take certain required courses: English 1, 2, 25, 26; Speech 3 and 4; two social sciences to be selected from Economics 25, Psychology 26, and Sociology 28; and twelve semester hours of science. In addition, at least three hours must be elected from one of the following: History 5, 6, 59, 60, or Government 25.

The requirements in Physical Education must also be satisfied. All physically fit men students must take Military 1, 2, 25, and 26.

Since the work of the first two years is directed toward a broad, general education as a foundation for the more specialized training of juniors and seniors, it follows that the program of studies for all schools is fairly uniform up to the junior year. Because of this, students can readily change from one curriculum to another or even from one school to another as both freshmen and sophomores.

Regardless of major, students who plan to teach should register early, in their freshman year if possible, with the Department of Education, although their work there does not begin until the junior year.

The minimum requirement for graduation is 60 junior-senior credits in addition to the satisfactory completion of the required and elective work of the first two years. Except upon special permission from the Provost or Registrar, no junior or senior shall enroll for more than 17 or less than 14 credits each semester.

During the junior and senior years, each student shall complete not less than 15, and not more than 30 credits in junior-senior courses in the department in which he is specializing.

It is the policy of the University that the final forty-five semester hours of scholastic work be taken in residence. Residence, for this purpose, is defined as a period of continuous enrollment and regular attendance in classes conducted on the campus of the University.

TRANSCRIPTS

Two transcripts of a student's record will be furnished without cost. For each additional copy there will be a charge of one dollar.

CONVOCATIONS

Throughout the year each School and Division of the University conducts convocation programs which are especially designed to give students opportunities of hearing from leaders in Science, Art, Government, Education, etc. Some of the convocations are devoted to student activities such as debates, declamation contests, band and musical concerts.

STUDENT ORGANIZATIONS

One of the values received from the University course is the training one acquires through participation in student activities. Student organizations offer excellent opportunities for development of leadership and broadening of outlook.

STUDENT GOVERNMENT

The student Senate operating under the student constitution and composed of elected representatives from the student body is the governing council of undergraduates. Its aim is to promote the general welfare of the University and, in doing so, groups of both students and faculty meet to further their mutual interests. The student Senate directs student conduct and represents the interests of the student body before the faculty.

ACADEMIC HONOR SOCIETIES

PHI KAPPA PHI.—The Massachusetts Chapter of the Honor Society of Phi Kappa Phi was installed on the campus in 1904. Its prime object is to emphasize scholarship and character. Senior students from all departments of the University are eligible for election to membership provided the scholastic and character requirements of the Society are met.

SIGMA XI.—The Society of Sigma Xi is a scientific fraternity to which members are elected on the basis of outstanding scientific research. The local chapter was established in 1938.

UPSILON MU EPSILON.—The Society of Upsilon Mu Epsilon was established at the University of Massachusetts in 1952. Its prime objectives are to emphasize engineering scholarship and character. Senior and junior students in the School of Engineering are eligible for election to membership if they meet scholastic and character requirements of the Society.

STUDENT HONORARY SOCIETIES

ADELPHIA.—A men's senior honorary society, recognizing men students who have been prominent in the extra curricular activities of the campus.

ISOGEN.—A women's senior honorary society. Its purpose is to recognize outstanding women students on the campus.

FRATERNITIES AND SORORITIES

Social fraternities on the campus include Alpha Epsilon Pi, Alpha Gamma Rho, Delta Phi Gamma, Delta Sigma Chi, Kappa Sigma, Lambda Chi Alpha, Phi Mu Delta, Phi Sigma Kappa, Q.T.V., Sigma Alpha Epsilon, Sigma Phi Epsilon, Tau Epsilon Phi, Theta Chi. An Inter-Fraternity council, consisting of representatives of these fraternities, has charge of rushing and all general matters dealing with fraternity life.

Sororities include Chi Omega, Kappa Alpha Theta, Kappa Kappa Gamma, Phi Delta Nu, Pi Beta Phi, Sigma Delta Tau, and Sigma Kappa. The Pan-Hellenic Council, made up of representatives from the sororities, supervises rushing and other sorority matters.

ACADEMIC ACTIVITIES

All academic activities are supervised by the Committee on Recognized Student Organizations composed of alumni, faculty, and students, and find recognition in the annual award of gold and silver medals.

THE COLLEGIAN.—This is a weekly newspaper published by undergraduates.

THE QUARTERLY.—A magazine in which the literary and artistic efforts of the students are published.

INDEX.—The year book.

UNIVERSITY HANDBOOK.—Published annually as a campus book of reference.

UNIVERSITY MUSICAL ORGANIZATIONS.—Open to all students of the University. For instrumentalists: Band, Dance Band, Orchestra and Ensembles; for vocalists: Chorus, Chorale, Operetta Guild and small combinations. A Women's Drill Team performs at home games and ceremonies. The University Concert Association provides an annual series of major concerts by famous artists.

Drama is represented on the campus by the Roister Doisters, open to all four-year students interested in the art of the theater; and the University players, open to those students who have shown outstanding ability, effort, and interest in some phase of dramatics through the Roister Doisters.

INTER-COLLEGIATE ATHLETICS

The University is represented in inter-collegiate athletics by teams in all the leading sports including football, soccer, cross country, basketball, swimming, indoor track, hockey, rifle and pistol, baseball, track, tennis, and golf. General policies governing athletics are directed by the Joint Committee on the Inter-Collegiate Athletics composed of alumni, faculty, and students.

PROFESSIONAL CLUBS

There are numerous professional clubs, established in connection with the various major courses of study. These clubs stimulate the students' professional interest in their chosen subject-matter fields and afford opportunity for discussion of technical subjects of mutual interest.

ALUMNI ASSOCIATION

The Associate Alumni is the general organization of the Alumni, men and women, of the University of Massachusetts. The association maintains headquarters at Memorial Hall, erected by Alumni and friends in honor of those men of the University who died in World War I.

It publishes a bulletin as the alumni publication of the University and, periodically, an Alumni Directory.

The Associate Alumni strives to advance the interests and welfare of the University of Massachusetts in every way possible and cooperates in its educational work.

Under alumni sponsorship, 12 self-liquidating dormitories have been built on campus.

The governing body of the Associate Alumni consists of its officers and a Board of Directors. Four directors are elected each year and serve a term of four years. All graduating seniors become members of, and contributors to, the Association at graduation, according to a tradition set by the Class of 1940.

HONORS, PRIZES, AWARDS

SCHOLARSHIP HONORS

UNIVERSITY HONORS. GROUPS.—At the beginning of each semester a list is posted of those students who during the previous semester made a general average of 80 per cent or better. Three groups are recognized: those between 90 and 100; those between 85 and 90; and those between 80 and 85.

DEPARTMENTAL HONORS.—A student who has shown outstanding promise within some department and has maintained a general scholastic average of 80 percent or better is permitted to apply for the privilege of registering for departmental honors. If his application is accepted by his department and the Honors Committee, he is allowed to pursue a course of independent study within the department of his choice throughout his senior year. This may include intensive reading, investigation or laboratory work in connection with some problem that he chooses for his consideration. The objective is to create initiative power of independent investigation and to develop the spirit of research. Although the student is responsible for his undertaking he is encouraged to consult with his department in regard to his work should the need arise. At the close of his study the student presents a thesis covering his investigation. In addition he may be required to appear for an oral or written examination. If by the excellence of his work he satisfies all the requirements of his department and the Honors Committee, his name will appear on the commencement program as receiving honors in the field of his specialization.

SCHOLASTIC PRIZES

PHI KAPPA PHI AWARD FOR SCHOLARSHIP.—Massachusetts Chapter of the Phi Kappa Phi, honorary scholarship society, offers an award of \$50 for outstanding work in scholarship. This is given to some member of the senior class at the opening of school in the fall. The award is based on the record of the first three years.

THE BURNHAM PRIZES.—These were made possible through the generosity of Mr. T. O. H. P. Burnham of Boston. Prizes of \$15 and \$10 are awarded to those students delivering the best and second best declamations in the Burnham contest. The preliminary contests are open under certain restrictions to freshmen and sophomores.

THE FLINT PRIZES.—The Flint Oratorical Contest was established in 1881 by a gift of the late Charles L. Flint, a former president of the College. After his death the prizes were continued by college appropriation. Prizes of \$30 and \$15 are awarded as first and second prizes respectively to those two students delivering the best orations in this contest.

THE HILLS BOTANICAL PRIZE.—This is given through the generosity of Henry F. and Leonard M. Hills of Amherst, for the first and second best herbaria. Competition is open to members of the senior, junior and sophomore classes. First prize is \$20, second prize \$15.

THE BETTY STEINBUGLER PRIZE IN ENGLISH.—This prize was endowed by John L. Steinbugler, New York City, in honor of his daughter Elizabeth Steinbugler Robertson, a graduate of this College in 1929. It is awarded to a woman

in the junior or senior class who has written the best long paper on a subject of literary investigation in a course in English during the year.

MASSACHUSETTS SOCIETY FOR PROMOTING AGRICULTURE PRIZES.—Three prizes of \$25, \$15, and \$10 are awarded to those senior students who are judged to have made the best records in the theoretical and practical work in agriculture required in their course of study, and in the special written and oral examination prepared for this award.

ATHLETIC AND ACADEMIC PRIZES

THE ALLAN LEON POND MEMORIAL MEDAL.—This medal is awarded for general excellence in football in memory of Allan Leon Pond of the class of 1920, who died February 26, 1920. He was a congenial companion, a devoted lover of Alma Mater, a veteran of World War I, a fine all-round athlete and a true amateur. He would rather win than lose, but he would rather play fair than win. He has been characterized as a typical student of the University.

THE WILLIAM T. EVANS MEMORIAL TROPHY.—This trophy is given each year to that member of the varsity football team who through his sportsmanship, football ability, character and personality, has thus exemplified the character and spirit of the person in whose memory this memorial trophy is dedicated. The trophy is dedicated to the memory of William T. Evans, a former member of the class of 1942, who died December 9, 1941. This trophy is presented annually by the class of 1942.

THE THOMAS E. MINKSTEIN MEMORIAL AWARD.—This award is made by the class of 1931 in memory of their classmate who died July 16, 1930 while he was captain-elect of football. The award is given to one of the outstanding men in the Junior Class who has as nearly as possible attained those standards of athletics, scholarship and leadership set by him whose memory this award honors.

THE GEORGE HENRY RICHARDS MEMORIAL CUP.—This cup is awarded annually to the member of the basketball team who shows the greatest improvement in leadership, sportsmanship, and individual and team play during the year. It is in memory of George Henry Richards of the Class of 1921 who died suddenly while a student at the College.

THE JOSEPH LOJKO MEMORIAL PLAQUE.—This plaque is presented to a senior who must be a letter man, have a satisfactory scholastic record and show those qualities of enthusiasm and cooperation which make for leadership. It is awarded in honor of Joseph Lojko of the Class of 1934, outstanding athlete who died while a senior in the College.

THE SAMUEL B. SAMUELS BASKETBALL CUP.—This cup is presented annually in the name of Samuel B. Samuels of

the Class of 1925 who was an outstanding basketball player during the early years of basketball as a varsity sport at the University. The trophy is awarded to that letter man who is a regular member of the varsity basketball team and who has performed with excellence during scheduled varsity games.

THE E. JOSEPH THOMPSON MEMORIAL TROPHY.—This baseball trophy is given by Thomas Thompson in memory of his brother E. Joseph Thompson who graduated from Massachusetts State College in 1932. He was president of the Student Senate, a varsity letter man in football and baseball, and an outstanding campus citizen. The award goes to that member of the varsity baseball team who best exemplifies the best characteristics of the sport each year.

CONSPICUOUS SERVICE TROPHY.—This trophy is awarded annually to that student who has made the most unique contribution to recognized student activities during the year.

MANAGER'S PRIZE.—Fifty dollars awarded annually to that activities manager who fulfills his routine duties most efficiently.

MILITARY HONORS AND AWARDS

Competed for yearly and presented at the Final Military Review.

UNITED STATES ARMY RESERVE OFFICERS TRAINING CORPS, ARMOR BRANCH

DISTINGUISHED MILITARY STUDENT.—Each year the Professor of Military Science and Tactics will select from the students who are completing the first year advanced course, ROTC, those who possess outstanding qualities of character, leadership, and a definite aptitude for the military service for designation as Distinguished Military Students.

DISTINGUISHED MILITARY GRADUATE.—Each year the Professor of Military Science and Tactics will designate the Distinguished Military Graduates from those Distinguished Military Students who have completed the advanced course, ROTC, and who will receive their baccalaureate degree. The Distinguished Military Graduates, with their consent, may be recommended to the Department of the Army for commission in the Regular Army.

THE SONS OF THE LOYAL LEGION TROPHY.—Awarded annually by the Massachusetts Chapter of the Sons of the Loyal Legion to the senior cadet ranking No. 1 for the year in Military Scholarship and Efficiency. Winner's name is engraved on a plaque and a sterling silver goblet, appropriately en-

graved, is given to the individual to keep in his permanent possession.

U.S. ARMOR ASSOCIATION SCROLL.—Awarded annually by the U.S. Armor Association to the outstanding Armor cadet graduating from the Senior ROTC class. An engraved scroll bearing the name of the winner is presented to the winning cadet for his permanent possession.

THE MILITARY SCIENCE TROPHY.—Awarded annually by the Department of Military Science, University of Massachusetts, to the Junior Armor cadet ranking No. 1 for the year in Military Scholarship. The name of the winner is engraved on a sterling silver goblet given to the individual to keep in his permanent possession.

RESERVE OFFICERS ASSOCIATION MEDAL.—Awarded annually by the Reserve Officers Association of the United States, Massachusetts Department, to the Junior Armor cadet who is outstanding in Military Proficiency. The winner's name is engraved on a plaque and a medal, appropriately engraved, is given to the individual to keep in his permanent possession.

THE ELIZABETH L. MCNAMARA TROPHY.—Awarded annually by Mrs. Elizabeth L. McNamara, a trustee of the University of Massachusetts for many years, to the Armor cadet ranking No. 1 in scholarship in the second year basic course. The winner's name is engraved on a plaque and a sterling silver goblet, appropriately engraved, is given to the individual to keep in his permanent possession.

THE JOHN C. HALL TROPHY.—Awarded annually by the Military Science Department, University of Massachusetts, to the Armor cadet ranking No. 1 in Military Proficiency in the second year basic course. The winner's name is engraved on a loving cup donated by the class of '02 in the name of John C. Hall and a gold medal appropriately engraved, is given to the individual to keep in his permanent possession.

THE AMHERST ROTARY CLUB TROPHY.—Awarded annually by the Amherst Rotary Club to the Armor cadet ranking No. 1 in Scholarship in the first year basic course. Winner's name is engraved on a plaque and a sterling silver goblet, appropriately engraved, is presented to the winner to keep in his personal possession.

THE MILITARY SCIENCE MEDAL.—Awarded annually by the Department of Military Science, University of Massachusetts, to the Armor cadet ranking No. 1 in Military Proficiency in the first year basic course. The winner's name is engraved on a gold medal which is presented to him to keep in his personal possession.

UNITED STATES AIR FORCE RESERVE OFFICERS TRAINING CORPS

DISTINGUISHED MILITARY STUDENT.—Each year the Professor of Air Science and Tactics will select from the students who are completing the second year advanced course, AFROTC, those who possess outstanding qualities of character, leadership, and a definite aptitude for the military service for designation as Distinguished Military Students.

DISTINGUISHED MILITARY GRADUATE.—Each year the Professor of Air Science and Tactics will designate the distinguished Military Graduates from those Distinguished Military Students who have completed the advanced course, AFROTC, and who will receive their baccalaureate degree. The Distinguished Military Graduates, with their consent, may compete for a regular Air Force Commission after serving on active duty for eighteen months.

AIR SCIENCE TROPHY.—Awarded annually by the Department of Air Science to the Air Science freshman cadet most outstanding in Military and Academic Scholarship. The trophy is a silver cup appropriately engraved which is given to the winner.

SONS OF AMERICAN REVOLUTION MEDAL.—Awarded annually by the Sons of the American Revolution to an Air Science sophomore cadet selected for Leadership, Soldierly Bearing and General Excellence. The winner's name is appropriately engraved on a medal which is presented to the individual.

AMHERST POST AMERICAN LEGION TROPHY.—Awarded annually by the Amherst Post American Legion to the Air Science sophomore cadet who has demonstrated the most outstanding abilities in Military Drill and Scholarship. The trophy is a suitably engraved silver cup which is presented to the winner.

AIR CADET SQUADRON TROPHY.—Awarded annually by the Air Cadet Squadron to an Air Science sophomore cadet who has been an outstanding member of the Air Cadet Squadron and Drill Team. A silver cup appropriately engraved with the individual's name is presented to the winner.

AIR SCIENCE TROPHY.—Awarded annually by the Department of Air Science to the Air Science junior cadet who has displayed outstanding Military proficiency and maintained a high scholastic standing. A silver cup appropriately engraved with the individual's name is presented to the winner.

AIR FORCE ASSOCIATION MEDAL.—Awarded by the Air Force Association to the most outstanding Air Science junior cadet. The award is a suitably engraved medal which is presented to the winner.

RESERVE OFFICERS ASSOCIATION MEDAL.—Awarded by the Massachusetts Reserve Officers Association to the graduating

Air Force cadet who has been outstanding in Scholarship and Military Proficiency. The award is a medal appropriately engraved, which is presented to the winner.

NORTHAMPTON BENEVOLENT PROTECTIVE ORDER OF ELKS TROPHY.—Awarded annually by the Northampton Lodge, BPOE, to the Air Science senior who by his zeal, effort and initiative has contributed most to the Corps of Air Cadets. The trophy is a suitably engraved silver cup which is presented to the winner.

DANIEL FUNGAROLI TROPHY.—Awarded annually by Mr. Daniel Fungaroli to the Air Science senior cadet who has been most outstanding at Summer Camp. The trophy is a silver cup appropriately engraved, which is presented to the winner.

AIR SCIENCE TROPHY.—Awarded by the Department of Air Science annually to the graduating Air Science senior cadet who has demonstrated superior qualities of Leadership, Military Bearing and Scholarship. The trophy is a silver cup appropriately engraved, which is presented to the winner.

ADMISSION TO THE UNDERGRADUATE COLLEGE

Those interested in applying for admission to the University of Massachusetts should write to the Registrar to obtain an application form. The first two pages of the application form are completed by the candidate himself. The last two are completed by high school or preparatory school authorities who mail the application form directly to the Registrar of the University.

Because of the increasing interest in college level study and the consequent increase in the number of applications, candidates are advised to file their applications early in the senior year of high school and certainly not later than March 1 of the year in which they plan to enter.

Candidates for the freshman class are accepted only for the opening of the college year in September. Students enrolled in other colleges may apply for admission to the Summer Session, but admission to the Summer Session does not necessarily constitute regular admission and enrollment in the undergraduate program of the University.

The University admits young men and women to the freshman class chiefly on the basis of character and scholarship. The general record must indicate promise of success and ability to profit by the opportunities which the University has to offer. Due regard is given to special achievement in specified subject matter fields.

SUBJECT REQUIREMENTS FOR ADMISSION

The subjects of preparatory study required for admission call for the satisfactory completion of a four-year high school course or its equivalent and are stated in terms of units. A unit is the equivalent of at least four recitations a week for a school year. High school graduation alone is not sufficient. The applicant's record must indicate capacity for handling the quality of scholastic work which the University has established as its standard of achievement.

Sixteen units of secondary school work must be offered, selected according to the following requirements:

Algebra	1½
Plane Geometry	1
English	4
Foreign Language (2 years of 1 language)	2
U.S. History	1

The remaining units are elective and may be selected from the following subject matter:

- a. Mathematics
- b. Science
- c. Foreign Language
- d. History and Social Studies
- e. Free electives (not more than four units)

Free elective subjects are those not included in groups a-d, as for example: Music, Art, Drawing, Typewriting, Aeronautics, Agriculture, Home Economics, etc. Such free electives are allowed in order that the student who wishes may have some opportunity to elect other high school offerings, while at the same time covering the fundamental requirements for college work.

Students planning to pursue an engineering curriculum should offer two years of Algebra, one of Plane Geometry, and one-half year each of Trigonometry and Solid Geometry, Chemistry and Physics are also advised. Those deficient in the Mathematics should plan to cover it during the summer prior to entrance or expect to take five years to complete the college course.

In high schools organizing agricultural club work under the supervision and rules of the Junior Extension Service of the University, one credit is granted for each full year of work approved by the State Leaders.

Candidates of exceptional ability and promise may be considered for admission even though some of the prescribed courses were not included in their high school program.

METHODS OF ADMISSION

Plan A. Students applying from accredited schools and making the college recommendation grade of their school in accordance with the subject requirements listed above are considered certified for admission.

Superior graduates of Vocational Schools of Agriculture in Massachusetts and Vocational Agricultural Departments in Massachusetts High Schools may be accepted for the Degree of Bachelor of Vocational Agriculture provided:

- a. They are unqualifiedly recommended by the Vocational Division of the Department of Education as bona fide Vocational Graduates with superior ranks; and

- b. That they can present at least 16 units of certified entrance credits, approved as to quality and quantity by the State Department of Vocational Education.

Plan B. Students who are not fully certified will be required to take the Scholastic Aptitude Test of the College

Entrance Examination Board. In some cases three Achievement Tests will be required also. The applicant will be informed what tests are to be taken as soon as his application is received or at the time of his personal interview. Candidates will ordinarily take these examinations in the spring of their senior year. Application blanks and a bulletin of general information concerning the tests may be obtained from the College Entrance Examination Board, P. O. Box 592, Princeton, New Jersey.

The University realizes that though almost all students will qualify under either Plan A or B, there will be a few promising candidates who, for one reason or another, are unable to meet fully the subject requirements for enrollment. Such applicants are requested to present their individual problems to the Registrar in order that the Admissions Committee may outline for them what must be done to qualify for enrollment.

ADMISSION TO ADVANCED STANDING

A limited number of students from approved colleges may be admitted on transfer to advanced standing. Since applicants for such admission usually exceed the number that can be accepted, they are placed on a competitive basis. Acceptance will thus depend upon recommendations and quality of record.

Candidates desiring to transfer to the University of Massachusetts from other institutions should write to the Registrar for a regular application form, inasmuch as a student applying for transfer must first of all be able to meet the entrance requirements of the University. Such candidates should also submit the following:

- a. A letter outlining reasons for wishing to transfer and describing briefly the type of major work to be followed if accepted for admission.

- b. An official transcript of entrance credits and college record to be sent by the Registrar of the College from which he wishes to transfer. This should be forwarded as soon as possible after the close of the semester preceding the one for which transfer is sought.

At least forty-five semester hours of work in residence are required of any transfer student desiring to be recommended for the Bachelor's degree.

UNDERGRADUATE CURRICULA

Undergraduate instruction is organized into a College of Arts and Sciences, the Schools of Agriculture and Horticulture, Business Administration, Engineering, Home Economics, Nursing, and the Division of Physical Education for Men.

This section of the catalogue deals with the opportunities for study and the curricula available in each of these departments of the University.

COLLEGE OF ARTS AND SCIENCES

_____, *Dean*

The College of Arts and Sciences includes the usual subject matter departments in which are offered the courses in general education essential for enlightened citizenship and later specialized and professional training. Most of the courses in the common prescribed curriculum for all freshman and sophomore students, regardless of their field of specialization, are taught in the College.

Each department offers the usual requirements of undergraduate specialization in its particular field. In addition, special curricula are provided to meet the needs of special groups of students. These include curricula for pre-medical, pre-dental, and pre-veterinary students; for those who plan to train as laboratory technicians and to enter the public health service; and for those interested in social work.

CURRICULA IN ARTS AND SCIENCES

The work of the first two years is largely prescribed, specialization occurring in the junior and senior years. The concentration of the junior and senior years gives the students as high a proficiency in their fields of specialization as is possible without sacrificing the objectives and requirements of a well-rounded education. The curriculum for the first two years follows:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1	2	English 2	2
Speech 3	1	Speech 4	1
Math. 7 or 5	3-4	Math. 8 or 10 or 6	3-4
1 Zoology 1 or Botany 1	3	1 Botany 1 or Zoology 1	3
Foreign Language	3	Foreign Language	3
2 Elective	3	2 Elective	3
Military 1 (men)	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

1 Those majoring in biological and physical science departments take Chemistry 1 and 2 (or 4); others take History 5 and 6.

2 Those not majoring in biological and physical science departments may take Chemistry 1 and 2 in place of Zoology 1 and Botany 1, or substitute Geology 27 for either Botany 1 or Zoology 1.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25	3	English 26	3
Sociology 28, Psychology 26, or Economics 25	3	Economics 25, Sociology 28, or Psychology 26	3
1 Science	3-4	1 Science	3-4
2 electives	6-7	2 electives	6-7
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

1 In selecting the required science course and the two electives, students should be guided by the recommendations for sophomore work given under the descriptions of junior-senior curricula that follow.

JUNIOR-SENIOR CURRICULA IN ARTS AND SCIENCES

Major work is available in the following departments during the last two years.

BACTERIOLOGY AND PUBLIC HEALTH

The department offers three curricula: one in Bacteriology, one in Public Health, and the other in Medical Technology.

BACTERIOLOGY

R. L. FRANCE, *Adviser*

The courses in bacteriology have been planned to furnish (1) a general training in this field for college students; (2) specialization for those contemplating a professional career in bacteriology.

Majors in bacteriology should elect the following in the sophomore year: Chemistry 29, 30; Physics 25, 26; Bacteriology 31; Zoology 35. The physics may be deferred until the junior year to allow for additional language study.

Juniors and seniors must take Chemistry 51, 52, and 79 and Zoology 84 in addition to the required work in Bacteriology and Public Health.

PUBLIC HEALTH

R. L. FRANCE, *Adviser*

Through the cooperation of several departments of the university and the Massachusetts Department of Public Health, curricula are provided for (1) a limited number of students interested in the many phases of public health service for which graduate work in medical or engineering schools is not essential; and (2) students planning graduate work in sanitary engineering.

Particular attention will be given to the training of sanitarians, district sanitary officers, food and milk inspectors, water and sewage treatment plant operators, technicians for public health laboratories, and agents for local boards of health. Students planning graduate work in sanitary engineering must also take Mathematics 29 and 30 (calculus) before the end of their junior year.

The following courses should be completed in the sophomore year: Bacteriology 31, Chemistry 29, Zoology 35, and Physics 25 and 26.

The following curriculum is required of all upperclassmen:

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Public Health 52, Sanitation	3
Public Health 61 Sanitation	3	Public Health 86, Field	
Public Health 63	3	Studies in Sanitation	2
Chemistry 51, Organic	4	Chemistry 52, Organic	4
*Elective	3	*Electives	6

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Statistics 77, Elem. Exp. Statistics	3	Public Health 84, Administration	3
Bacteriology 81, General applied	4	Public Health 88, Epidemiology Communicable	
Zoology 69, Parasitology	3	Disease Control	3
*Electives	6	Bacteriology 90, Sanitary Bact.	3
		*Electives	6

* During the junior-senior years, students elect a minimum of 21 semester credits from the following:

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Hus. 53, Elements of Meat Packing	3	Bact. 52, Advanced	3
Chem. 63, Water and Sewerage	3	Bact. 82, Food	3
Govt. 61, Public Administration	3	Public Health 64, Planktology	3
Mech. Engineering 1, Drawing	3	Dairy Ind. 52, Market Milk	4
Civil Engineering 77, Water Supply	3	Govt. 62, Public Administration	3
Food Tech. 75, Food Preservation	3	Civil Engin. 78, Sewerage	3
Forestry 51, Management of Water Sheds	3	Ent. 60, Pest Control	3
Geol. 27, Physical Geology	3	Ent. 74, Medical Ent.	3
Vet. Sci. 78, Pathology	2	Food Tech. 92, Food Analysis	3
		Home Ec. 52, Nutrition	3

CURRICULUM IN MEDICAL TECHNOLOGY

R. L. FRANCE, *Adviser*

This curriculum provides a broad fundamental training for young women who plan to qualify as medical technologists. The program more than meets the basic collegiate requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists. Students taking this curriculum should be prepared to spend a year's internship in a certified hospital laboratory after graduation.

Students taking this curriculum should complete the following sciences in the sophomore year: Bacteriology 31; Chemistry 29, 30; Zoology 35, and Physics 25, 26.

The junior-senior program follows:

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 51, Advanced	3	Bacteriology 52, Advanced	3
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Public Health 61, Sanitation	3	Public Health 62, Sanitation	
Zoology 51, Microtechnique	3	or Public Health 88, Com-	
or Bacteriology 56,		municable disease control	3
Methods	2	Zoology 51, Microtechnique	3
*Electives	3	or Bacteriology 56,	
		Methods	2
		*Electives	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bacteriology 81, Applied	4	Bacteriology 82, Applied	3
Bacteriology 85, Serology,		Bacteriology 92, Clinical	3
Immunology	3	Chemistry 80, Clinical	3
Zoology 69, Medical		*Electives	6
parasitology	3		
*Electives	6		

* During the junior-senior years students elect 21 credits from the following:

History, required course	Zoology
Chemistry 79, Biochemistry	Liberal Arts
Chemistry 82, Qualitative organic	

BOTANY

T. T. KOZLOWSKI, *Adviser*

The purpose of the courses in botany is to provide a thorough background for specialization in the science, and to support and supplement the work of other fields in which knowledge of plant life is held to be important. Certain courses should likewise prove of interest and value to the general student.

Those who wish to specialize in botany will find here an ample field and an adequate opportunity for advanced undergraduate study. Post-graduate training, often with provision for financial aid, is available in most graduate institutions, and many teaching, research and industrial positions in schools,

and colleges, experiment stations, federal and state services and private enterprise are open to the trained botanist.

The curriculum offers to the student an opportunity to acquire either a broad general knowledge of botany, or to devote himself to more extensive study in one of the major divisions of the science, such as Plant Morphology and Taxonomy, Plant Physiology, Mycology and Plant Pathology. Under the direction of his adviser each student selects a program of courses in botany and other sciences, humanities and arts which seems best adapted to his particular botanical objectives.

Specialization in botany assumes the satisfactory completion of certain basic and supporting courses prior to the junior year. These include Botany 1, 25 and 26; Chemistry 1, 2 and 29; and a modern language. Two years of German are advised.

The junior-senior program requires that courses in botany to the amount of 15-30 credits be chosen under the guidance of the adviser. He will also make recommendations in regard to electives.

CHEMISTRY

W. S. RITCHIE, *Adviser*

The objectives in chemistry are to give the student an understanding of the subject which will enable him to appreciate the relation of chemistry to other sciences, and to industry, and to provide training for those who intend to become teachers and workers in the allied sciences, and for those who wish to go on to graduate study and into a professional career in chemistry. Completion of the course in chemistry fits the student for positions in the chemical industries and related fields as well as in the agricultural industry, for employment in state and Federal agricultural experiment stations and commercial laboratories, for teaching and for graduate study.

Students planning to major in chemistry should elect German in the freshman year. The sophomore program should include Chemistry 29, 30; Mathematics 29, 30; and Physics 25, 26.

In the junior year the chemistry major takes Chemistry 51, 52, 65, and 66. In the senior year he takes German 81 and 82, Chemistry 83, and elects at least three of the following courses: Chemistry 77, 81, 82, 86, 93, 94.

ECONOMICS

P. L. GAMBLE, *Adviser*

In economics the aims are twofold: (1) to give the student an understanding of economic theory and of the application of economic principles to the organization of society;

(2) to provide students with the elementary training necessary for further study of economic and business problems.

The department requires that all majors irrespective of the career desired take the following courses: Economics 53, 73, 79, Accounting 25, and Agricultural Economics 79 or Mathematics 62. In addition, each student must select an additional 12 credit hours of work from the Economics curriculum. No major student is permitted to take more than 36 junior-senior credit hours of economics, agricultural economics and business administration courses. In choosing elective courses students are urged to select courses in the humanities and preferably some from the allied fields of history, philosophy, government, psychology, and sociology. Those intending to major in economics should elect Economics 26 in the sophomore year.

For the majors in the Economics department, there are offered courses which may be combined to serve as preparation toward a number of different careers. Among others, possible careers in the following fields are open:

Banking and Finance	Public Utilities
Government Service	Social Security
International Trade	Statistics
Labor and Personnel Relations	Transportation and Com- munication

EDUCATION

A. W. PURVIS, *Adviser*

The department through its undergraduate program seeks to utilize the forces of the University to prepare teachers for elementary and secondary schools and through its graduate offering to prepare administrators and specialists in public education. Its program is based upon the assumption that teachers and other school personnel should have a broad liberal education, considerable mastery of at least one field, and professional courses which should lead to a knowledge of the persons to be taught, familiarity with the problems to be met, and practice in the best techniques of teaching and supervision.

In order to realize these aims, all students who contemplate teaching as a career should register early, in their freshman year if possible, with the department of education although their work there does not begin until the junior year. Admission to either a minor or major in education to prepare for teaching will be determined largely by a composite rating based on scholarship as determined by University grades and success in the beginning course in History of Education, and on personality ratings by members of the staff.

Currently there are two avenues leading toward a career of teaching in either elementary or secondary schools. The student may (1) major in Education or (2) minor in Education and major in a subject-matter field. Although the department does not insist there are strong arguments in favor of the latter procedure. In either case the program in Education is essentially as follows:

FOR ELEMENTARY SCHOOL TEACHING (D. J. McCarthy, adviser)—either a minor or major in Education. Arrangements have been made for students to major in English, History, Psychology or Home Economics and still obtain the required courses.

Junior Year: Education 51, 64, Music 62, Psychology 94.

Senior Year: one full semester Education 60, 61, 62, 85. Art 33 and 34 are strongly recommended.

FOR SECONDARY SCHOOL TEACHING—either a minor or major in Education.

Junior Year: Education 51, 52, 83, 88.

Senior Year: Education 53, 85. Psychology 56 is strongly recommended.

Several cooperative special-field programs for teachers have been developed as follows:

TEACHER-TRAINING IN AGRICULTURE. (C. F. Oliver, adviser.) By a cooperative agreement with the State Division of Vocational Education, persons otherwise qualified may prepare to teach vocational agriculture by the satisfactory completion of Education 72, 73, and 75. Education 52 is also recommended. To insure a desirable range of preparation, students who contemplate vocational teaching should consult (early in the freshman year if possible) Professor Oliver and the State Supervisor of Agricultural Teacher-Training. A vocational teacher-training certificate is awarded by the Vocational Division to those who fully qualify.

TEACHER-TRAINING IN HOME ECONOMICS. (Mrs. S. C. Piatt, adviser.) These students will major in home economics and elect Education 51, 53, 83, and 85. Home Economics 81 and Psychology 56. A selected few may be chosen each year for the One-Semester Plan.

TEACHER-TRAINING IN PHYSICAL EDUCATION. (S. W. Kauffman, adviser.) These students will major in physical education and elect at least eighteen hours of the academic field to be taught. They should elect Education 51, 52, 85, and 88, Physical Education 54, Psychology 56.

TEACHER-TRAINING IN MUSIC. (D. Alviani, adviser.) These students will major in Music and elect Education 51, 52, 85, 88, and Psychology 56.

ENGLISH

F. P. RAND, *Adviser*

The department of English offers courses in English composition and literature and in speech. Students majoring in this department must conform to the institutional and school requirements for freshman and sophomore years, and in choosing sophomore electives should include two semesters of modern language and one semester of English history.

The courses in English are intended to enable students to express themselves effectively and to appreciate humanistic values and the ideals of English-speaking people throughout their history. They also offer an appropriate, and in some instances an adequate, classroom training for work in such fields as teaching, authorship and editing.

The student majoring in English must earn 30 credits in elective courses in English. However, for six of these he may substitute elective courses in technical writing, other languages or speech.

JOURNALISM

The journalism courses are designed to provide professional guidance for students interested in newspaper work or related fields. Such students are advised to compete for membership on the college newspaper while freshmen or sophomores, take the introductory course (Journalism 85) as juniors, and elect other courses in social science and literature. Selected seniors will be provided a limited amount of actual professional experience.

ENTOMOLOGY

C. P. ALEXANDER, *Adviser*

Courses in entomology serve a variety of functions, such as to give students a broad knowledge of insects, particularly in their relations to man, his crops, his animals, and his health. Students are trained to become entomologists in the service of the United States, or in various state, territorial, or foreign services, especially in the field of agriculture. Other fields of training include forest entomology; medical entomology; control of pests in buildings; research, technical service or sales work with manufacturers of insecticides; teachers of zoology, particularly entomology, at the university level; and various other branches.

The courses in beekeeping are offered with the following aims: (1) to meet the increase in vocational opportunities for the production of bees or honey as a business; (2) to study the beekeeping needs of fruit and truck-crop industries and the part that bees play in the pollination of flowers; (3) to acquaint the student with a recreational field that can be made profitable.

Majors are required to take Entomology 26 in the sophomore year. Strongly recommended sophomore subjects include Botany 25, 26; Zoology 25, 35; Chemistry 29, 30; and either French or German, or both.

Juniors and seniors should support their work in entomology with the following courses: Botany 51, 52; Bacteriology 61, 62; Chemistry 51, 52; Zoology 51, 69, 70; Pomology 56; English 84; and selected courses in education, floriculture, forestry, horticulture, and other subjects.

GEOLOGY AND MINERALOGY

L. R. WILSON, *Adviser*

The offerings in geology and mineralogy are intended chiefly for those who wish to gain some acquaintance with one or more branches of earth science. For the general student prerequisite requirements are reduced to a minimum. A program of moderate specialization may be provided for science majors who are interested in geology.

To major in geology a student must complete thirty credit hours of work in the department. Those who have completed nine or more credits in geology in addition to the sophomore courses by the end of the junior year, and who wish to satisfy major requirements for graduation in the field of geology, will be given individual or group problems in the senior year. The nature of the work will depend upon student interest and preparation. In any junior or senior course in geology an additional period per week without credit may be required of students who specialize in this field. Chemistry through qualitative analysis and a year's work in college physics represent minimum requirements in these respective fields for undergraduate specialization in physical geology. For those interested in pursuing studies in stratigraphy or paleontology, work beyond the freshman year in the systematic aspects of both botany and zoology is essential for satisfactory progress.

GERMAN

F. C. ELLERT, *Adviser*

The courses in German are intended to give a practical knowledge of the language for the purpose of wider reading, research, and oral communication.

During the junior and senior years each student will complete not less than 24 and not more than 30 credits in the junior-senior German courses. German 59, 79, and 80 are required of all major students. Students planning to use the language professionally are also urged to supplement their courses here with a summer session at an approved school of German.

HISTORY AND GOVERNMENT

HISTORY

H. W. CARY, *Adviser*

The courses in history are intended to impart an understanding of the people of the world and their problems through an analysis of man's development in the past. A major in this field should provide the student with a broad cultural background and a basis for good citizenship. History may have special value for the following groups:

(1) Those who plan to teach history or the social studies.

(2) Those who plan careers in which considerable knowledge of history is desirable. These might be in fields such as law, government service, journalism, and library work.

Prospective majors should ordinarily elect History 31 and 32 in the sophomore year. Government 25 is recommended. Major students must earn a minimum of 26 credit hours in history from the junior and senior courses. The following courses are required: History 59, 60, 91, 92. The student must elect one of the following courses which deal with a period prior to 1500: History 51, 75, 76. In addition, he should select, in consultation with his adviser, a program of elective courses from fields related to the major.

GOVERNMENT

FRED V. CAHILL, JR., *Adviser*

The work in government aims to give the student an understanding of the principles of government and their application to the organization of society, and to provide him with elementary training necessary for positions in government service or further study on the graduate level. It thus may be considered either as pre-law or pre-professional work, in addition to its general cultural utility.

Majors in the field should elect Government 25 and 28 in their sophomore year. In the junior and senior years a minimum of eight additional courses in government is recommended; these may be elected from the following: Government 52, 61, 62, 63, 64, 65, 66, 67, 68, 93, 94, or History 53. In addition eight supporting courses in other social sciences are recommended; these may be chosen from the fields of history, economics, sociology, or psychology. The remaining junior-senior courses should be chosen from the fields of languages, literature, philosophy, art, or music.

MATHEMATICS

A. E. ANDERSEN, *Adviser*

The department offers courses designed to furnish a cultural background as well as a foundation for both undergraduate and graduate work in such fields of science as physics

and chemistry, in engineering and in other technical subjects.

The courses recommended for majors in the department are designed to prepare students for high school teaching, graduate study in mathematics, actuarial work, statistical work, or work as engineering aides.

All majors are required to take Mathematics 29 and 30 and Physics 25 and 26 in the sophomore year. In the junior and senior years each major must take Mathematics 53, 54, 91, and 92 and must, in addition, complete at least 12 credits in other junior-senior courses. Prospective majors should consult the department, for a list of recommended courses.

MUSIC

D. J. ALVIANI, *Adviser*

The courses in music are open to all university students depending on their training, experience, ability and talent. The department of music supervises and directs the activities of a number of musical organizations which offer opportunities to students for the development of skill in playing, singing, acting, and attitudes for artistic growth of intellectual, practical, and social intelligence. Music courses furnish an understanding of the history and interpretation of music, a knowledge of basic theory, and training in applied music.

The music major student is expected to adjust his elective courses to fit his individual needs in preparation for work in the fields of: music education, music merchandising, private teaching, the ministry, the armed forces, church music, private school music, kindergarten music, bi-subject teaching, music library administration, music in radio, television, recreation and industry, institutional music therapy, and advanced study in music.

During the sophomore year all music majors must elect Music 25 and 26. They must pass a piano examination and they may be expected to study voice or an instrument privately before graduation.

PHILOSOPHY

H. N. GLICK, *Adviser*

Philosophy in general attempts to offer a comprehensive understanding of the universe and makes an effort to decide what one should do while living in it. The distinctive purpose of the courses in philosophy is to concentrate on methods of inquiry, standards of thought, search for values in personal and community life, and the analysis of artistic expression and standards of criticism.

The student majoring in this subject will complete a minimum of 21 credits in junior-senior courses in philosophy. A wide range of supplementary courses is advised, among

which the following are acceptable: Chemistry 88, Government 66, 71, 82, Education 51, English 51, 74, 79, 80, Art 75, 77, 78, Music 51, 52, History 77, 78, Mathematics 72, Psychology 61, 90, French 51, 52, Sociology 53, 82.

PHYSICS

W. F. POWERS, *Adviser*

The physics courses give opportunity for the study of basic physical laws and phenomena of nature. From these courses students may make a selection to satisfy a major in physics, or to comply with requirements for graduate study.

Majors must take Physics 25, 26 and Mathematics 29, 30 in the sophomore year. Juniors and seniors are advised to support their physics major courses by electives in mathematics, such as differential equations, vector analysis, and chemistry. Since the interests of major students vary, the department advisers will be glad to make suggestions regarding programs of study.

PSYCHOLOGY

C. C. NEET, *Adviser*

The courses in the psychology department are designed (1) to impart an understanding of behavior and the application of this knowledge to problems of human adjustment; and (2) to give preparation for professional work in psychology and related fields.

Careers open to psychology majors include: teaching and research, guidance, psychometrics, personnel and industrial work, child welfare, abnormal and clinical psychology, opinion polling, social work and government service. Additional training is required for certain of these careers.

Students planning to major in psychology should elect Psychology 26 and Psychology 28 in the sophomore year. In the junior and senior years majors are advised to take a minimum of 24 credits in psychology. Courses 51 and 90 are required. As broad a cultural background as major programs will permit is advised.

Majors planning careers primarily in experimental and physiological psychology should plan to take one or more courses during their four years in mathematics, physics, and zoology. Those planning careers in abnormal and clinical psychology and in child welfare should elect specified courses in education, English, sociology, and zoology; while those planning careers in psychometrics, guidance, personnel and industrial work, and government service should take certain courses in business administration, economics, education, industrial engineering, and sociology.

RECREATION LEADERSHIP

J. J. PERRY, *Adviser*

The students who desire to train for various positions in the field of recreation will major in the department of recreation leadership. Positions open to majors in this field include leadership in such activities as park, community, nature, camping, and institutional recreation. During junior and senior years the students will undertake a core program consisting of Recreation 51, 52, 54, 75, 76, and 77. After consultation with his adviser the student will elect Recreation 53 or 78 or any other course which seems to meet his individual needs.

ROMANCE LANGUAGES

C. F. FRAKER, S. C. GODING, *Advisers*

Two majors are offered: French and Spanish. The courses in these curricula are intended to give rounded and practical knowledge of the languages for the purpose of wider reading, research, and oral communication, leading to a better understanding of all aspects of the intellectual, spiritual, and material attainments of the nations concerned.

Students majoring in French or Spanish are required to complete at least 30 approved junior-senior credits, six of which may be in English or another foreign language. Those preparing to use the language professionally are urged to supplement their courses with a summer session at an approved school of languages.

SOCIOLOGY

J. H. KORSON, *Adviser*

The courses in sociology are planned with two aims in view:

(1) To give the student an understanding of the factors which influence men in their activities and interests as members of society, and

(2) To prepare those students who are interested in teaching at the elementary or high school level; or those students interested in careers with government agencies; or in careers as social workers with state or private agencies to gain the pre-professional courses necessary before embarking on such careers. Some agencies require work on the graduate level before full-time employment is obtained, while others offer in-training opportunities to graduate majors in sociology. Programs for students interested in teaching are prepared in cooperation with the Education department.

All major students are required to take Economics 25 and Psychology 26. At least 24 junior-senior credits in sociology are required. Students are required to take Sociology 53 and

82 and are urged also to select courses in economics, history, government, psychology, and as many in the humanities as possible.

SOCIAL WORK

The American Association of Schools of Social Work indicates that the pre-professional subjects most closely related to professional work in this field are economics, political science, psychology, and sociology. The Association recommends that prospective students of social work or social administration take not fewer than 12 semester hours in one of these subjects while taking less in others. It also recognizes the value of courses in biology, history, English, as well as other subjects contributing to a broad cultural background for the student.

SPEECH

A. E. NIEDECK, *Adviser*

The program in speech is planned to assist students in the entire university who wish training in oral communication, and to provide an opportunity for students in the College of Arts and Sciences to major in speech and drama. All students planning to major in speech should elect Psychology 26 in their sophomore year. In addition to the courses in the department, speech majors must take English 55 and 68, and Philosophy 82 to fulfill the requirements for graduation.

ZOOLOGY

G. L. WOODSIDE, *Adviser*

The courses in zoology have two major aims: (1) to offer students an opportunity to develop an understanding and appreciation of the scientific method as a part of a liberal education; and (2) to provide training for prospective graduate students in biology; medicine, dentistry, and related fields, as well as future teachers and laboratory technicians in the biological sciences.

The minimum requirements for majors are: Zoology 1, 35, 50, 53, 71, 72, and either 83 or 84; Chemistry 1, 2, 29, 30, 51, 52; Physics 25, 26.

SPECIAL CURRICULA IN ARTS AND SCIENCES

In addition to the major work provided in the departments previously listed, the following special curricula are available. For the most part these cut across departmental lines. Students in these curricula follow the uniform science program for the freshman year and the recommendation in regard to sophomore electives indicated in each curriculum.

PRE-MEDICAL CURRICULUM

Advisory Committee: G. L. Woodside, Chairman, G. W. Alderman, L. M. Bartlett, W. S. Ritchie, J. H. Smith.

Pre-medical and pre-dental students should register with a member of the pre-medical advisory committee as soon as possible after entering the university. Pre-veterinary students may register with the pre-medical advisory committee or with the school of their choice. Pre-medical or pre-dental students will be assigned a member of the committee as adviser, and as long as they remain pre-medical or pre-dental students they will continue under this adviser. The assignment is made alphabetically as follows: A-C, Dr. Woodside; D-G, Dr. Smith; H-L, Dr. Ritchie; M-R, Dr. Bartlett; S-Z, Mr. Alderman. During the second semester of the sophomore year the committee will study the academic record and general qualifications of every pre-medical and pre-dental student. After such careful study specific recommendations will be made as to whether each student should continue with the curriculum or change his objective and choose another major.

During the first two years the student in this curriculum follows the program outlined on page 90. He will be required also to complete fifteen junior-senior credits in the department of his choice, but the member of the pre-medical advisory committee to whom he has been assigned will continue to be his adviser. In the sophomore year the following courses should be elected: Chemistry 29, 30; Physics 25, 26; German 25, 26. In the senior year Chemistry 65, 66 (Physical) is highly recommended (prerequisites, Mathematics 29, 30).

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Zoology 71, Comp. Vert.		Zoology 72, Vert. Embryology	4
Anatomy	4	Electives	9
History	3		
Electives	6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Electives	15	Zoology 84, Cellular	4
		Electives	12

The electives of the junior and senior years should include the requirements of the department in which the student wishes to major. Pre-medical students should elect as many non-science courses in the College of Arts and Sciences as possible, since Class A medical schools uniformly stress the importance of the broad general education.

SCHOOL OF AGRICULTURE AND HORTICULTURE

D. H. SIELING, *Dean*

The School of Agriculture and Horticulture with its several departments offers a broad general education with specific training in some phase of agriculture or horticulture. Upon the completion of the requirements for graduation, the student will have devoted about one-quarter of his time to pure science, one-quarter to social and humanistic studies, and about one-half to applied science and technology in agriculture and horticulture.

A broad choice of electives within the required courses of each curriculum gives the student the opportunity to prepare for (1) actual agricultural production; (2) research, teaching, or extension work; or (3) industrial work.

Each department of the school has specific requirements for graduation which are included in the descriptive matter under the name of the department. To prevent overspecialization, each student is required to elect at least 12 junior-senior credits in some other school of the University, one-half of these credits to be in the humanities and social sciences.

During the first semester of the freshman year, students interested in teaching vocational agriculture, extension work, or specializing in research work, should consult with the head of the department in which they plan to major.

The School comprises the following departments: Agricultural Economics and Farm Management, Agronomy, Animal Husbandry, Dairy Industry, Floriculture, Food Technology, Forestry and Wildlife Management, Landscape Architecture, Olericulture, Pomology, Poultry Science, and Veterinary Science. Students may major in any one of these departments except Veterinary Science.

CURRICULA IN AGRICULTURE AND HORTICULTURE

All students will take the following uniform curriculum during the first two years:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
¹ Mathematics 7, Algebra and Trigonometry	3	¹ Mathematics 8 or 10	3
² Chemistry 1, General	3	² Chemistry 2, General	3
Botany 1, General	3	Zoology 1, General	3
Military 1 (men)	3	Agronomy 2, Soils	3
³ Elective	3	Military 2 (men)	2
Physical Education 3 (men)	1	Physical Education 4 (men)	1
Physical Education 7 (women)	2	Physical Education 8 (women)	2
		Hygiene (women)	1

¹ Candidates for the Bachelor of Vocational Agriculture degree will take Government 25 and 28 in place of Mathematics.

Students who expect to take Calculus in the sophomore year should elect Mathematics 10.

² Those intending to major in Landscape Architecture and Ornamental Horticulture may substitute a foreign language or History 5 and 6 for the year course in Chemistry.

³ Students intending to major in Agricultural Economics, Agronomy, Animal Husbandry, Dairy Industry or Poultry Husbandry will take Animal Husbandry 1, Agriculture. Students intending to major in Floriculture, Forestry, Landscape Architecture, Olericulture or Pomology will take Horticulture 1, Plant Propagation. Forestry majors will take Forestry 26, Dendrology, in place of Agronomy 2. Wildlife Management majors are required to take a year of modern language and Agronomy 2 during freshman and sophomore years. Food Technology majors will take Mechanical Engineering 1, Drawing. One year of foreign language may be substituted for Drawing 1 and Agronomy 2 by special permission.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Econ. 25, Psych. 26 or Soc. 28	3	Econ. 25, Psych. 26 or Soc. 28	3
¹ A Science	3-4	¹ A Science	3-4
² Electives	6	² Electives	6
Military 25 (men)	2	Military 26 (men)	2
Physical Education 27 (women)	2	Physical Education 28 (women)	2
Physical Education 33 (men)	1	Physical Education 34 (men)	1

¹ To be selected from the following:

Bacteriology 31, 31A
Botany 25, 26, 28
Chemistry 29, 30, 33
Geology 27, 28
Mathematics 29, 30

Physics 25, 26
Zoology 25, 35
Entomology 26
Civil Engineering 27

² The student will be guided in his selections by his major adviser.

JUNIOR-SENIOR CURRICULA IN AGRICULTURE AND HORTICULTURE

At the end of the sophomore year each student selects one of the following curricula as his major to complete his collegiate training.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

A. H. LINDSEY, *Adviser*

The purpose of the Agricultural Economics and Farm Management major is to train students for positions in those private and government institutions servicing the agricultural industry and to assist in the training of farm managers.

The department maintains an inventory of current price information and agricultural production reports from which price study and analysis may be made. Statistical machines are also available for computation and analysis. The laboratories of the department must be found in business institutions

and on farms in Massachusetts with which contact is maintained.

Two curricula are available.

AGRICULTURAL ECONOMICS

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Ec. 55, Mark'g Farm Prod.	3	Ag. Ec. 56, Coop. in Agri. Agricultural Electives	3 6
Ag. Ec. 57, Agri. Credit	3	General Electives	6
Agricultural Electives	6		
General Electives	3		

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25	3	Agri. Ec. 76, Farm Mgt.	2
Agri. Ec. 79, El. Statis.	3	Agricultural Electives	3
Ag. Ec. 75, Farm Mgt.	3	General Electives	11
Agricultural Electives	3		
General Electives	3		

All Agricultural Economics majors must take the courses listed above. Specialization may be in one of the three following fields: (1) Animal products, (2) Fruits and Vegetables, (3) Feeds and Fertilizers.

The following courses should be completed for each of these specialized fields:

<i>Animal Products</i>	<i>Fruits and Vegetable</i>	<i>Feed and Fertilizer</i>
An. Husb. 53	Pomology 53	Agronomy 51
An. Husb. 54	Pomology 77	Agronomy 52
Dairy 52	Olericulture 74	Agronomy 78
Dairy 77	Olericulture 78	An. Husb. 51
Dairy 78	Food Technology 75	An. Husb. 78
Poultry 75		An. Husb. 78
		Poultry 56

FARM MANAGEMENT

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agri. Ec. 55, Mktg. Farm Prod.	3	Agri. Ec. 56, Coop. Agri. Agronomy 52, Soil Util.	3 3
Agri. Ec. 57, Agri. Cr.	3	Agri. Ec. 78, Land Econ.	3
An. Husb. 51, Nutrition	3	Bus. Law 70	3
Electives	6	Electives	3

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agri. Ec. 71, Theory	3	Agri. Ec. 76, Farm Mgt.	2
Ag. Ec. Farm Mgt.	3	An. Husb. 78, Dairy Cattle Prod.	4
Agronomy 51, Field Crops	3	Poultry 78, Management	2
Forestry 55, Mgt. Woodlands	3	Electives	8
Electives	3		

AGRONOMY

W. G. COLBY, *Adviser*

The department of agronomy is equipped with modern soils, crops and chemical laboratories, greenhouses, and utilizes parts of the university farm for fertilizer and plant

growth experimentation, and for demonstration of soil utilization and conservation.

The courses are designed to give instruction concerning the basic knowledge of the soil and its management, fertilizers, and their uses as related to the principal products of the field. Crop improvement practices and the science of crop improvement are stressed for those who are interested in agronomy as a specialty.

There is sufficient flexibility within the curriculum to allow the student to specialize in soil science, plant science, soil conservation or general agronomy. Those students who have a desire to receive training which will qualify them for investigational work in these fields may obtain it by selecting appropriate supporting science or vocational subjects as electives. This training equips them to serve as specialists in one of these selected fields for industrial corporations and may serve also as training for extension or teaching work.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agron. 57, Soil Formation	3	Agron. 52, Soil Utilization	3
Zoology 53, Genetics	3	Electives	9
Electives	6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Agron. 51, Field Crops	3	Agron. 78, Fertilizer and	
Chem. 51, Organic	4	Soil Fertility	3
Electives	9	Chem. 52, Organic	4
		Electives	9

ANIMAL HUSBANDRY

V. A. RICE, *Adviser*

The broad purpose of the animal husbandry major is that of providing the basic training for specialists in animal husbandry. Upon graduation, opportunities are available in the practical, scientific or commercial fields of animal husbandry; i.e., livestock farming, research, teaching, administration, or in the business phases of the livestock industry.

Students who major in the department of animal husbandry must successfully complete one summer of placement training as a requirement for graduation.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Husb. 51, Nutrition of Farm An.	3	An. Husb. 56, 56A, Beef and Sheep Production	4
An. Husb. 53, El. Meat Packing	3	Electives	
Electives			

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
An. Husb. 75, An. Breeding	4	An. Husb. 76, Animal	
An. Husb. 81, Seminar	1	Breeding Practice	1
Electives		An. Husb. 78, Dairy Cattle	
		Production	4
		An. Husb. 82, Seminar	1
		Electives	

DAIRY INDUSTRY

D. J. HANKINSON, *Adviser*

Major students in dairy industry receive training in the testing, handling, and processing of milk, ice cream, butter, cheese, and other milk products. Practical application is made of chemistry, bacteriology, economics, and engineering in the many phases of dairy work.

The dairy industry department, with student laboratories for the testing and manufacture of dairy products, research laboratories, and commercial scale milk and ice cream plant facilities, is housed in Flint Laboratory, a building devoted solely to dairy work.

Dairy industry graduates may secure responsible positions with commercial dairy manufacturing firms, or with equipment and supply firms. Opportunities are offered also for positions as teachers in high schools and colleges, for service in the fields of extension and research, and for sanitation and public health work with city, state or federal agencies.

Major students in dairy industry must successfully complete one summer of placement training in a dairy plant. It is recommended that this requirement be met during the summer immediately following the sophomore year of University residence.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 77, Butter and		Dairy Ind. 50, Judging	1
Cheese	4	Dairy Ind. 52, Mkt. Milk	4
Chem. 51, Organic	4	Chem. 52, Organic	4
Bact. 61, Public Health	3	Electives	6
Electives	6		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Dairy Ind. 75, Chemistry	3	Dairy Ind. 78, Ice Cream	4
Dairy Ind. 79, Seminar	1	Dairy Ind. 80, Seminar	1
Bact. 81, Applied	4	Bact. 90, sanitary	3
Agr. Engin. 80 Food Process		Electives	9
Eng.	3		
Electives	6		

FLORICULTURE

C. L. THAYER, *Adviser*

The courses in floriculture provide for a comprehensive and detailed study of the practices and principles involved in the production, marketing and uses of cut flowers, flowering and foliage plants grown outdoors and under glass. Opportunities available to graduates may include: positions in various fields of commercial floriculture, such as production, wholesale marketing and retailing; employment in nurseries, on private estates and in conservatories; positions in the professional field, including graduate study, teaching in colleges and secondary schools, research and extension work under state, Federal, or other supervision.

It is advantageous for the student to determine, as soon as possible, the type of position for which he wishes to fit himself since the choice of elective courses will depend largely on his decision.

All major students in floriculture must successfully complete one summer of placement training in work related to their major objective and approved by the head of the department. It is recommended that this requirement for graduation be met during the summer following the freshman or sophomore year.

As sophomores majors are advised to take Chemistry 29 and Botany 26 for their sciences. First semester electives should be Botany 25 and Olericulture 25; second semester Entomology 26 and Floriculture 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 51, Greenhouse Mgt.	3	Flori. 52, Flower Arrange-	
Flori. 79, Conservatory		ment	3
Plants or	2	Flori. 54, Greenhouse Const.	3
Flori. 81, Herb. Gardens		Plant Breeding 52, Methods	3
and borders	3	Botany 52, Advanced Plant	
Zoology 53, Prin. of Genetics	3	Pathology	3
Entomology 51, Pests of		Electives	3
Special Crops	3		
Botany 51, Plant Pathology	3		
Electives	2-3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 75, Commercial	3	Flori. 76, Commercial	3
Flori. 79 or	2	Flori. 82, Seminar	3
Flori. 81	3	Botany 68, Physiology	3
Botany 67, Physiology	3	Electives	8
Electives	5-9		

FOOD TECHNOLOGY

C. R. FELLERS, *Adviser*

The department offers a curriculum in food technology, and is preparing curricula for two new options recently

approved—one in fisheries technology and one in food management.

The curriculum in food technology provides scientific and applied training in the principles concerned with the processing, preservation, and packaging of foods and food products. Both home and commercial methods of food preservation are considered. Practical work includes canning, freezing, dehydration, fermentation and salting. Methods of manufacture of jams, jellies, fruit juices, and beverages are a part of the course work. An effort is made to apply the student's background in chemistry, physics, and bacteriology to food technology problems and food analysis.

The curriculum gives the student a broad science background with specialized knowledge in food processing and preservation. Special courses are offered for home economics majors who plan to teach or do extension work in foods. Major fields open to graduates include: (1) commercial work in cannery, freezer and other plant operation; (2) control and analytical work related to food products; (3) government food inspection and grading; (4) technological work in government and industry.

Ambitious students are encouraged to acquire the background which will enable them to pursue graduate work and research in the application of scientific knowledge to the technology of foods.

The selection of supporting courses depends upon the objective of the student, which should be determined as early as possible.

Food technology majors should take Physics 25 and 26 and Chemistry 29 and 30 in the sophomore year; also, if possible, Bacteriology 31. Students planning to take Physical Chemistry should complete Mathematics 29 and 30.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 51, Introductory	3	Food Tech. 52, Food Prod.	3
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Bacteriology 51	3	Bacteriology 82, Applied	3
Agr. Engin. 80, Food Eng.	3	Agr. Engin. 82, Refrigeration	2
Elective		Electives	

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Food Tech. 61, Industrial Technology	3	Food Tech. 62, Industrial Technology	3
Food Tech. 71, Food Science Literature	2	Food Tech. 72, Food Science Literature	2
Food Tech. 91, Analysis of Food Prod.	3	Food Tech. 92, Exam. of Food Prod.	3
Chemistry 79, Elem. Biol. or	4	Food Tech. 82, Confections and Cereal Products or	2
Chemistry 65, Physical	3	Chemistry 65, Physical	3
Electives		Electives	

SUGGESTED JUNIOR-SENIOR ELECTIVES

Public Health 61, 62, 63	Poult. Husbandry 75
A Foreign Language	Olericulture 73, 74
Mechanical Engin. 1, 63	Botany 66
Pomology 77	Home Ec. 30, 52, 54
Dairy Ind. 75, 77, 52 or 78	Food Tech. 85, 95
Animal Husbandry 53	Chem. Engin. 77, 75
	Indus. Engin. 25, 51

FORESTRY AND WILDLIFE MANAGEMENT

This department offers two curricula, one in Forest Production and Management and one in Wildlife Management.

FORESTRY

R. P. HOLDSWORTH, *Adviser*

The technical curriculum in forestry is concentrated in the field of forest production and management, and leads to the degree of Bachelor of Science. It has professional status, being accredited by the Society of American Foresters.

The freshman and sophomore years are devoted to studies of basic sciences. English, and other subjects of cultural-foundational value. A required group of three courses—forest mensuration, forest harvesting, and plane surveying—is presented in a nine-weeks summer term immediately following the freshman year. During the summer following the sophomore year qualified students are recommended for work giving practical field experience in forestry. Such employment may be with the United States Forest Service or other public and private agencies.

Ten technical courses in forestry are grouped in the junior and senior years in addition to three supporting courses presented by other departments, a required course in history, and six student electives. It is intended that the forestry curriculum be as sound professionally and as broad from the viewpoint of general education as is possible within the limits of four undergraduate years.

Students who complete the forestry curriculum with high academic standing may be admitted to graduate professional schools for work toward a Master of Forestry degree. This is usually obtainable with one year. Seniors are eligible to compete in Federal and State Civil Service examinations.

The forestry courses are open with few exceptions to students other than those concentrating in forestry but should be elected only after consultation with the student's major adviser and with the instructor teaching the course.

Sophomore majors in forestry take Psysics 25 and Geology 27 the first semester; Entomology 26, Physics 26, Botany 28, and Agronomy 2 the second semester.

SUMMER (FOLLOWING FRESHMAN YEAR)

Forestry 55, Forest Mensuration.	Credit, 3.
Forestry 78, Forest Harvesting.	Credit, 3.
Civil Engineering 27, Plane Surveying	Credit, 3.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Forestry 53, Silvics	3	Forestry 56, Prin. of Silviculture	3
Forestry 59, Protection	3	Forestry 54, Forest Soils	3
Forestry 75, Products	3	Wildlife Mgt. 72, Forest-Animal Relationships	3
History	3	Entomology 72, Forest Ent.	3
Elective (not Forestry)	3	Elective (not Forestry)	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Forestry 8, Regional Silvicult.	3	Forestry 82, Seeding and Planting	3
Forestry 57, Forest Policy & Econ.	3	Forestry 80, 52, Photogrammetry, Forest Mgt.	3
Botany 51, Plant Pathology	3	Forestry 52, Photogrammetry	3
Electives (not Forestry)	6	Electives (not Forestry)	6

WILDLIFE MANAGEMENT

R. E. TRIPPENSEE, Adviser

The courses in conservation and wildlife management are designed for those who desire a general understanding of the renewable natural resources as well as those who expect to make a living in the professional field of wildlife management. Courses are available also to students who expect to major in other fields including agriculture, agronomy, economics, forestry, entomology, and education.

Wildlife management is both an applied science and an art and is concerned with the production and control of animal populations on many types of land including farms, forests, and on waste lands and water areas. Thus an understanding of both the origin and management of land and water is necessary. These background phases include geology, agronomy, forestry, and agriculture. Fields of specialization include fisheries management, game, and furbearer management and control of injurious animals, and related fields such as soil conservation, conservation education, and industrial biology.

Studies in wildlife management are closely correlated with the work of the State Conservation Department and the U.S. Fish and Wildlife Service. During the junior and senior years trips are planned to the bait-mixing station of the U.S. Fish and Wildlife Service, the John C. Phillips Wildlife Laboratory at Upton, Mass. and to numerous wildlife projects in

the state. Students are urged to attend the northeastern and the American wildlife conferences.

Graduates in this field are eligible to both state and federal civil service examinations, and most of the permanent job opportunities are in public service either with the state or federal government. A limited number of positions are open in private enterprises. Training in the wildlife field is an excellent background for teaching of science in the public schools and for employment as conservation officers. Much research data and many research operations are available to undergraduates through the Massachusetts Cooperative Wildlife Research Station, and students with sufficiently high grades are eligible for graduate work at other universities.

The courses during the first two years are basic educational subjects required to build a background of sound professional training. Sophomores are expected to take Geology 27, Zoology 35, Wildlife Management 27, Agronomy 2, Entomology 26, and Forestry 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 71 or 75	3	Botany 26	3
Fores. 55	3	Wildlife Management 70	3
Gov't 25	3	Wildlife Management 74 or 84	3
Electives*		Gov't 28	3
		Forestry 56	3
		Electives*	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Wildlife Management 75 or 71	3	Wildlife Management 74 or 84	3
Botany 53	3	Forestry 52	3
Electives*		Electives*	

* Electives should be chosen in consultation with the student's adviser.

LANDSCAPE ARCHITECTURE

R. H. OTTO, *Adviser*

Instruction in this department has two objectives: first a contribution to general education; second, a preparation of students for the practice of landscape architecture. The department offers optional curricula, (1) Professional Landscape Architecture, and (2) Ornamental Horticulture.

The department also offers several elective courses in art (listed and described under Directory of Courses, page 97) which do not constitute a major. These courses are primarily cultural rather than technical and are intended to provide a better appreciation of the arts.

LANDSCAPE ARCHITECTURE

Students following this curriculum are prepared to take up work in landscape architecture, which leads through field experience or post-graduate study to permanent establishment in the profession.

Sophomores in the first semester elect either Botany 25 or Geology 27 for their science and take Landscape Architecture 25 (Drawing) and Civil Engineering 27 as electives. In the second semester the science is either Entomology 26 or Geology 28 and the electives Landscape Architecture 26 (Drafting) and Horticulture 26 (Plant Materials).

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Elements of Landscape Arch.	3
Landscape Arch. 53, Intro. Design	3	Landscape Arch. 54, General Design	3
Hort. 51, Plant Materials	3	Landscape Arch. 86, City Planning	3
Landscape Arch. 79, Construction & Maintenance alternates with Landscape Arch. 83	3	Hort. 52, Planting Design	3
Elective	3	Electives	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Landscape Arch. 81, Advanced Design	3	Landscape Arch. 84, Sketching	2
Landscape Arch. 87, City Planning	3	Landscape Arch. 82, Advanced Design	3
Landscape Arch. 83, alternates with Landscape Arch. 79	3	Art 78, History of Art	3
Electives	6	Landscape Arch. 80, History & Lit. of Landscape Arch.	2
		Electives	5

SUGGESTED ELECTIVES FOR JUNIOR AND SENIOR YEARS

Agronomy 53, 56, Agrostology	Floriculture 81, Herbaceous Borders
Civil Engin. 90, Contracts, Specifications, and Estimating	Philosophy 82, Aesthetics
Agri. Engin. 51, House Planning	Art 33, 34, 75

ORNAMENTAL HORTICULTURE

The curriculum in ornamental horticulture is suggested for those preferring to follow the horticultural phase of landscape including (1) nursery practice; (2) landscape planting and construction; and (3) maintenance of landscaped areas, such as parks and semi-public institution grounds.

Sophomores in this major will take Botany 25, Civil Engineering 27, Landscape Architecture 25 in the first semester; Entomology 26, Floriculture 26, and Horticulture 26 in the second.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Hort. 51, Plant Materials	3	Hort. 52, Planting Design	3
Landscape Arch. 51, Topography	3	Landscape Arch. 52, Construction details	3
Landscape Arch. 53, Garden Design	3	Pomology 26, Small Fruits	3
Landscape Arch. 79, Construction & Maintenance	3	Landscape Arch. 54, General Design	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Flori. 81, Herbaceous Borders	3	Agrostology 56, Turf Mgt.	3
Agrostology 53, Turf Grasses	3	Pomology 56, Spraying	3
Zoology 53, Genetics	3	Plant Breeding 52, Methods	3
Ent. 51, Pests of Sp. Crops	3	Electives	6
Botany 51, Plant Physiology	3		

SUGGESTED ELECTIVES FOR JUNIOR AND SENIOR YEARS

Botany 67, 68, 81	Agronomy 78
Entomology 72	Forestry 56

OLERICULTURE

G. B. SNYDER, *Adviser*

The courses in olericulture offer a comprehensive training in the scientific principles and commercial practices related to the culture and marketing of vegetable crops. The studies and training involved are set up to prepare graduates to undertake work in the following fields: (1) practical work in operating commercial market garden or truck farms or greenhouse establishments, (2) teaching olericulture and related subjects in college, secondary or high schools, (3) extension work in horticulture and agriculture, (4) research studies with state, Federal, or private agencies, (5) state, Federal, or private inspection service agencies, and (6) the wholesale and retail marketing of vegetables and other perishable commodities.

The department of olericulture has facilities in greenhouses, plant houses, hot beds, machinery and equipment used in production and marketing procedures as well as land to provide the student ample opportunity to become acquainted with modern techniques and practices used in handling vegetable crops. Nearby truck farms, wholesale and retail market outlets, variety trial plots of seed companies and inspection agencies are used to demonstrate laboratory and classroom points of discussion.

The rather broad objectives of the training mean that the selection of supporting courses depends upon the specific field in which the student wishes to engage on graduation. This objective should, therefore, be determined as early as possible during the sophomore year.

Majors in olericulture should take the following courses during the first semester of the sophomore year: Botany 25, and Olericulture 25. In the second semester they should include Chemistry 29, Entomology 26, and Pomology 26.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 51, Nutrient Requirements	3	Oleri. 52, Environment and Plant Culture	3
Zoology 53, Genetics	3	Oleri. 76, Greenhouse Crops	3
Botany 51, Plant Pathology	3	Botany 68, Plant Physiology	3
Botany 67, Plant Physiology	3	Electives	6-8
Electives	5		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Oleri. 73, Marketing Practices	3	Oleri. 74, Merchandising of Perishables	3
Oleri. 75, Systematic	3	Oleri. 78, Commercial	3
Oleri. 81, Seminar	1	Oleri. 82, Seminar	1
Entomology 51, Pests of Special Crops	3	Electives	10
Electives	7		

POMOLOGY

A. P. FRENCH, *Adviser*

The pomology courses provide a comprehensive training in the scientific and commercial principles concerned in the growing and marketing of apples, pears, peaches, plums, cherries, and small fruits. Major fields open to graduates include: (1) practical work in connection with the operation of fruit farms; (2) teaching in college, high school, or secondary schools of agriculture; (3) extension work in county, state, or nation; (4) research work with state, federal or private concerns; and (5) commercial work in connection with the manufacture and sale of such supplies as machinery, packages, and spraying and dusting materials. Certain supporting courses are required and their selection depends upon the objective of the student. That objective should, therefore, be determined as early as possible.

First semester sophomores are advised to elect Geology 27, Physics 25, and Olericulture 25. In the second semester they should take Chemistry 29, Entomology 26 and Pomology 26.

The selection of junior-senior electives should be undertaken with the help of the departmental adviser. They will depend for the most part on the interests and objectives of the students and his class record to date. The student who wishes to do college teaching, extension work, or research is advised to secure a broad foundation in science and liberal arts, and to plan to enter a graduate school sooner or later. The student whose objective is growing fruit or teaching in

secondary school may need to broaden his training in horticulture and agriculture and, again, will need all the science and liberal arts that can be included in the program.

Students majoring in Pomology must successfully complete one summer of placement training on a fruit farm before the beginning of the senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 53, General	3	Pomology 56, Orchard Pest Control	3
Pomology 75, Systematic or	4	Botany 68, Psychology	3
Pomology 77, Commercial	3	Botany 30, Plant Anatomy	3
Botany 51, Plant Pathology	3	English 84, Tech. Writing	3
Botany 67, Physiology	3	Electives	3
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Pomology 81, Advanced	3	Pomology 82, Advanced	3
Pomology 75, Systematic or	4	Pomology 84, Seminar	1
Pomology 77, Commercial	3	Electives	12
Pomology 83, Seminar	1		
Zoology 53, Genetics	3		
Electives	5		

CURRICULUM IN CRANBERRY TECHNOLOGY

This curriculum is designed to provide a broad training in the fields of knowledge which serve as the foundation of the cranberry industry. Its purpose is to provide future leaders and specialists for the industry.

Students who follow this curriculum must satisfactorily complete a minimum of two summers' practical experience in the cranberry industry before the beginning of the senior year.

Courses taken during the freshman and sophomore year will be the same as those outlined for others majoring in Pomology. The choice of junior-senior electives will depend upon the objective of the student and will be made with the assistance of the adviser.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chem. 33	3	Pomology 56, Spraying	3
Botany 51, Plant Pathology	3	Ag. Econ. 26, Ag'l Prod.	3
Ent. 51, Pests of Special Crops	3	Electives	
Electives			

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bot. 67, Plant Physiology	3	Bot. 68, Plant Physiol.	3
Ag. Econ. 55, Marketing	3	Ag. Econ. 56, Cooperatn.	3
Pom. 85, Cranberry Prob.	2	Pom. 86, Cranberry Prob.	2
Electives		Electives	

POULTRY HUSBANDRY

F. P. JEFFREY, *Adviser*

The department gives instruction in the science, art and practices of poultry keeping, not only to students specializing in this department, but also to those in other departments who desire supporting work in poultry husbandry. The major courses prepare men for the successful operation of commercial poultry and breeding farms and hatcheries either as owners or managers; for high school, college and federal work in teaching, extension and research; and as service men, specialists and managers in industrial fields allied to the poultry industry.

Students must successfully complete one summer of placement training on a poultry farm or in some business allied to poultry.

Sophomores may choose electives from the list of sophomore sciences or Dairy 25, Animal Husbandry 26, Agricultural Economics 26, Olericulture 25, Pomology 26, Floriculture 26, or Wildlife Management 27.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Poultry Husb. 55, Housing and Sanitation	2	Poultry Husb. 52, Incubation and Brooding	3
Poultry Husb. 53, Judging	3	Poultry Husb. 56, Nutrition	3
Zoology 53	3	Electives	
Electives			

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Poultry Husb. 75, Marketing	2	Poultry Husb. 78, Seminar and Farm Management	3-4
Poultry Husb. 77, Breeding	3	Poultry Husb. 76, Turkey Prod.	2
Vet. Sci. 75, Comp. Vet. Anat.	3	Vet. Sci. 88, Avian Path.	3
Electives		Electives	

VETERINARY SCIENCE

Though major work in Veterinary Science is not available, the department does offer supporting courses to assist students who expect to enter the various fields of agriculture, wildlife management, public health, teaching and laboratory work in the biological sciences or veterinary medicine.

SCHOOL OF BUSINESS ADMINISTRATION

MILO KIMBALL, *Dean*

The School of Business Administration prepares students eventually to assume positions of responsibility in business. An objective of the School is the education of young men and women who will regard management in business as

a profession with high ethical standards and broad social responsibilities. The curricula provide preparation for specialized tasks in accounting, finance, industrial administration, marketing, and merchandising. When less specialization is desired, the student selects the General Business program. Each course of study leads to the professional degree of Bachelor of Business Administration.

CURRICULA IN BUSINESS ADMINISTRATION

In keeping with the objectives of the School, the curricula encourage breadth of training for business. General education is emphasized by providing fundamental courses in the humanities, mathematics, science, and social studies. The courses for the first two years are therefore largely prescribed.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Government 25, American	3	History 6, Mod. European	
Mathematics 7 or 5	3	Civ.	3
English 1, Composition	2	Mathematics 8 or 10 or 6	3
Speech 3	1	English 2, Composition	2
Industrial Adm. 11, Indus.		Speech 4	1
Geography or Foreign		Economics 12, Ec. Hist. of	
Language	3	U. S. or Foreign Language	3
Elective, Science	3	Elective, Science	3
Military 1	3	Military 2	2
Physical Ed. 7 (women)	2	Physical Ed. 8 (women)	2
Physical Ed. 3 (men)	1	Physical Ed. 4 (men)	1

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Accounting 25, Introduction		Accounting 26, Introduction	
to	3	to	3
Economics 25, Elements	3	Economics 26, Prob. of Nat'l	
English 25, Humane Letters	3	Economy	3
Psychology 26, General	3	English 26, Humane Letters	3
Elective	3	Sociology 28, Elements	3
Military 25	2	Elective	3
Physical Ed. 33 (men)	1	Military 26	2
Physical Ed. 27 (women)	2	Physical Ed. 34 (men)	1
		Physical Ed. 28 (women)	2

† Students majoring in Merchandising take Home Ec. 2 in place of Acct. 26.

JUNIOR-SENIOR CURRICULA IN BUSINESS ADMINISTRATION

The channels to specialization in a particular area of business lead through basic courses in production, marketing, finance, accounting, statistics and business law. The junior-senior programs are based on this core. Students thus acquire an awareness of each of the fundamental functions of business

and develop facility in the use of the basic tools of management. They develop understanding of the relationship of their particular interest to all business activities as well as competence in a special field.

GENERAL BUSINESS

MILO KIMBALL, *Adviser*

This program is given for students whose interest is in general business management. It is designed to provide understanding of the broad administrative aspects of business, and specialized courses are subordinated to a comprehensive program of training. It prepares also for study of a more specialized nature in graduate school.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Fin. 55, Financial Inst.	3	Ec. 56, Business Fluctuations	3
Mkt. 53, Marketing Prin.	3	Ind. Adm. 66, Transportation	3
Ind. Adm. 63, Mgt. in Ind.	3	& Traffic	3
Statistics 79, Elem. Econ. Stat.	3	Fin. 65, Corp. Fin.	3
Elective	3	Fin. 76, Insurance	3
		Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Bus. Law 70, Bus. Law I	3	Ind. Adm. 80, Adm. Proced.	3
Ec. 73, Modern Econ. Theory	3	Ec. 78, Public Finance	3
Ec. 79, Labor Problems	3	Bus. Law 72, Bus. Law II	3
Professional Elective	3	Professional Elective	3
Elective	3	Elective	3

ACCOUNTING

R. M. COLWELL, *Adviser*

Accounting deals with the problems of measuring, recording, reporting and interpreting business transactions. This program is designed for the student who wishes to undertake preparation for employment as auditor, controller, cost analyst, industrial accountant, public accountant, private accountant, or teacher of accounting.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Fin. 55, Finan. Inst.	3	Bus. Law 70, Bus. Law I	3
Statistics 79, Elem. Econ. Stat.	3	Acct. 62, Advanced Acct.	3
Mkt. 53, Marketing Prin.	3	Acct. 64, Cost Acct.	3
Acct. 61, Intermediate Acct.	3	Fin. 65, Corp. Fin.	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 73, Modern Ec. Theory	3	Ec. 78, Public Finance	3
Ind. Adm. 63, Mgt. in Ind.	3	Fin. 82, Investments	3
Acct. 75, Adm. Acct. & Control	3	Acct. 74, Acctg. Systems	3
Elective	6	Acct. 76, Auditing	3
		Elective	3

FINANCE

J. B. LUDTKE, *Adviser*

Courses in banking, finance and insurance are provided for students who expect to assume responsibility for financing a business or to work for banks, investment institutions, brokerage houses, insurance companies, or governmental agencies concerned with finance. The curriculum provides for study of our financial institutions, financial organization and management, the principles of insurance, and investment analysis and management.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Fin. 55, Finan. Inst.	3	Ec. 56, Business Fluctuations	3
Fin. 65, Corporation Finance	3	Statistics 79, Elem. Econ.	
Ind. Adm. 63, Mgt. in Ind.	3	Stat.	
Mkt. 53, Mktg. Principles	3	Bus. Law 70, Business Law I	3
Elective	3	Professional Elective	3
		Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 73, Modern Econ. Theory	3	Fin. 76, Insurance	3
Ec. 79, Labor Problems	3	Ec. 78, Public Finance	3
Fin. 81, Problems of Bus. Fin.	3	Fin. 82, Investments	3
Electives	6	Electives	6

INDUSTRIAL ADMINISTRATION

S. VANCE, *Adviser*

American industry offers to qualified students the opportunity to find satisfying careers in the various fields in industrial management, labor relations, or personnel management. The program offered is designed to give the student specialized training in these fields and a comprehensive understanding of the problems of industrial enterprises.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Fin. 55, Finan. Inst.	3	Bus. Law 70, Bus Law I	3
Ec. 79, Labor Problems	3	Ind. Adm. 64, Personnel Mgt.	3
Ind. Adm. 63, Mgt. in Ind.	3	Ind. Adm. 66, Transp. & Traffic	3
Statistics 79, Elem. Econ.		Acct. 64, Cost Acct.	3
Stat.	3	Elective	3
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Acct. 75, Adm. Acct. & Control	3	Psych. 86, Industrial	3
Mkt. 53, Mkt. Prin.	3	Ind. Engin. 88, Time & Motion Study	3
Fin. 65, Corporation Finance	3	Mkt. 56, Purchasing	3
Ec. 73, Modern Ec. Theory	3	Ind. Adm. 80, Admin. Procedure	3
Elective	3	Elective	3

MARKETING

H. E. HARDY, *Adviser*

Students in marketing prepare for a variety of occupations in wholesale and retail enterprises and the selling activities of industry and advertising as auxiliary services to business. The program offers specialized study of basic types of market operations.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Fin. 55, Finan. Inst.	3	Mktg. 54, Sales Mgt. & Salesmanship	3
Mktg. 53, Mktg. Prin.	3	Mktg. 56, Purchasing	3
Ec. 79, Labor Problems	3	Bus. Law 70, Bus. Law I	3
Statistics 79, Elements	3	Ind. Adm. 66, Transportation & Traffic	3
Elective	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ec. 55, Ec. of Consumption	3	Mktg. 72, Market Research	3
Ec. 73, Modern Ec. Theory	3	Mktg. 74, New England Markets	3
Mktg. 71, Retail Merchandising	3	Psych. 86, Industrial Psych.	3
Mktg. 73, Advertising	3	Professional Elective	3
Elective	3	Elective	3

MERCHANDISING

H. E. HARDY, *Adviser*

This program has been planned in cooperation with the School of Home Economics to meet the growing demand for women with technical training to fill positions of responsibility in merchandising. The program is sufficiently flexible to allow individual choice in the fields of clothing, foods, or home furnishings.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mkt. 53, Mkt. Prin.	3	Mkt. 72, Research	3
Ec. 55, Econ. of Consump.or		Bus. Law 70, Bus. Law I	3
Home Ec. 75, Econ. of Household	3	Home Ec. 52, Nutrition or Home Ec. 62, Home Furnish-ing	3
Home Ec. 51, Food Selection or Home Ec. 57, Clothing Select.	3	Professional Elective	3
Professional Elective	3	Elective	3
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mkt. 71, Retail Merchandising	3	Ind. Adm. 64, Personnel Mgt.	3
Mkt. 73, Advertising	3	Home Ec. 88, Appld. Dress Dsn. or	3
Home Ec. 87, Tailoring or Home Ec. 91, Inst. Mgt.	3	Home Ec. 92, Inst. Mgt.	3
Professional Elective	3	Professional Elective	3
Elective	3	Electives	6
		Field Work in Retailing	

SCHOOL OF ENGINEERING

G. A. MARSTON, *Dean*

The departments of agricultural engineering, chemical engineering, civil engineering, mechanical engineering and electrical engineering comprise the School of Engineering. Each department offers a curriculum leading to a Bachelor of Science Degree in that particular branch. An optional curriculum in industrial engineering is offered in the mechanical engineering department.

The Civil, Electrical, Mechanical, and the Industrial optional curricula have been accredited by the Engineers Council for Professional Development.

Engineering can be defined as the combination of science and art by which materials and power are made useful to mankind. An engineer requires intensive technical training but at the same time he should acquire the broad education that distinguishes the professional man from the technician. His education does not end with formal schooling but continues throughout his life as he accumulates experience.

The curricula in engineering have been carefully prepared to offer each student the opportunity to acquire a sound training in the fundamental work of the various branches of his chosen field. At the same time he receives a thorough training in the sciences and mathematics, which are the important tools of the engineer. About twenty per cent of his time is devoted to the social and humanistic studies. Some opportunity to pursue his particular interest is offered in the senior year.

The curriculum of the freshman year is the same for all. Specialization to a limited extent begins in the sophomore year.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 5, Analytical		Mathematics 6, Diff. Calculus	4
Geom.	4	Chem. 2 or 4, General	3 or 4
Chem. 1, General	3	Mechanical Eng. 2, Drawing	3
Mechanical Engineering 1,		*Hist. 6, Fren., Ger., or Span.	3
Drawing	2	Military 2	2
*Hist. 5, Fren., Ger., or Span.	3	Physical Ed. 4	1
Military 1	3		
Physical Ed. 3	1		

* French or German recommended for Chem. Engin. majors.

SOPHOMORE-JUNIOR-SENIOR CURRICULA

Majors in Engineering will select one of the following curricula.

AGRICULTURAL ENGINEERING

H. N. STAPLETON, *Adviser*

Agricultural engineering is concerned with the application of scientific engineering principles to the agricultural industry in which mechanical and electrical power, processing equipment, design and development of a farm structure, soil and water conservation, research, extension, teaching, and promotional activities form parts.

The curriculum is designed to prepare students soundly in basic sciences, engineering, and humanistic subjects for service in this expanding field. There is opportunity for limited specialization and generous provision for electives in the third and fourth years.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Eng. 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 25, Mech., Sound, Heat	4	Physics 26, Light, Elect.	4
Civil Engin. 27, Surveying	3	Civil Engin. 34, Statics	3
Mech. Engin. 39, Materials of Construction	2	Psych. 26, or Soc. 28	3
Military 25	2	Military 26	2
Phys. Ed. 33	1	Phys. Ed. 34	1

SUMMER (6 WEEKS)

Civ. Engin. 28, Prop. & Topog. Surveying	3	Civ. Engin. 30, Route Sur- veying Practice	3
(or approved industrial or farm employment)			

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Engl. 83, Tech. Writing	2	Econ. 25, General	3
Civ. Eng. 52, Dynamics	3	Agron. 2, Soils	3
Civ. Eng. 51, Strength of Mat'l	4	Civ. Eng. 61, Testing Mat'ls	2
Elec. Eng. 61, Principles of	4	Elec. Eng. 62, Principles of	4
Mech. Eng. 65, Heat Eng.	3	Mech. Eng. 68, Kinematics	3
Ag. Eng. 71, Mech. Power	3	Ag. Eng. 73, Farm Structures	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ag. Eng. 85, Farm Electrifi.	3	Ag. Eng. 92, Seminar	1
Ag. Econ. 75, Farm Mgt.	3	Ag. Eng. 76, Agr. Machinery	3
Mech. Eng. 83, Machine Design	3	Ag. Eng. 78, Drain, Recl., Consv.	3
Civ. Eng. 75, Fluid Mech.	3	Civ. Eng. 90, Constr., Spec., Est.	3
Ag.* & Tech.* Electives	6	Ag.* & Tech.* Electives	8-9

* Electives to be selected in consultation with the student's adviser.

CHEMICAL ENGINEERING

E. E. LINDSEY, *Adviser*

Chemical Engineering is that branch of engineering concerned with the development of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may usually be resolved into a co-ordinated series of unit operations (physical changes) and unit processes (chemical changes). The work of the chemical engineer is primarily concerned with the design, construction, and operation of equipment and plants in which series of these unit operations and processes are applied. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

Chemical engineers are employed not only in these industries manufacturing chemicals but in many others where there occur chemical changes and physical changes other than forming and shaping which is the province of mechanical engineering. Examples are: petroleum refining, coal processing, refractories and clay products, cement, waste treatment, pulp and paper, rayon and textiles, paint and varnish, natural and synthetic rubber, foods, leather, plastics, soap, penicillin and other antibiotics. Much of the work of the atomic energy program is chemical engineering. The types of work done by chemical engineers include: design, construction, research, development, production, financial and patent appraisal, management, and sales.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chem. 29, Qualitative Analy.	4	Chem. 30, Quantitative Analy.	4
Physics 27, General	4	Physics 28, General	4
Math. 31, Applied Calculus	4	Math. 32, Diff. Equations	4
English 25, Humane Letters	3	English 26, Humane Letters	3
Military 25	2	Chem. Engin. 26, Calculations	2
Physical Education 33	1	Military 26	2
		Physical Education 34	1

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Chemistry 65, Physical	4	Chemistry 66, Physical	4
Civil Engin. 34, Statics	3	Civil Engin. 51, Strength of Mat.	4
Chem. Engin. 55, Unit Opera. I	5	Chem. Engin. 56, Unit Opera. II	5
Economics 25, Elements	3	Psych. 26 or Sociology 28	3

SUMMER (6 WEEKS)

Chem. Engin. 75, Instrumentation	2	Chem. Engin. 88, Chem. Engin. Lab.	3
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* Advanced military students will take Economics 25 and either Psychology 26 or Sociology 28 as two of their senior electives.

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chem. Engin. 81, Heat-Energy Rel.	3	Chem. Engin. 82, Ind. Equil. & Kinetics	3
Chem. Engin. 93, Compreh. Prob.	3	Chem. Engin. 94, Comphen. Prob.	3
Chem. Engin. 91, Seminar	1	Chem. Engin. 92, Seminar	1
Elec. Engin. 63, Elements	3	Elec. Engin. 64, Indus. Applic.	3
Chem. Eng. 89, Lab. Projects	3	Electives	8
Electives	6		

Advanced military students will take Economics 25 and either Psychology 26 or Sociology 28 as two of their senior electives.

Recommended electives include history, government, French, German, Math. 83, English 83, Chem. 57, 58, 95, 98, Chemistry 77, 79, 86, 93, 94, Mech. Engin. 39, 46, Business Law 70. Other courses may be chosen with the approval of the Head of the Department.

CIVIL ENGINEERING

M. P. WHITE, *Adviser*

Civil engineering is concerned with structures, transportation, movement of fluids, use and storage of water, sanitation, and surveying and mapping. A civil engineer may be engaged in research, in planning and designing, in construction, or in maintenance and operation. Consequently, civil engineering contains room for a wide range of interests—from highly theoretical to very practical.

The curriculum gives a thorough training in the fundamental sciences and at the same time prepares a student for work in any branch of civil engineering. During his senior year a student takes two or three elective technical courses, allowing him to specialize to some extent in whatever branch of civil engineering is most interesting to him—sanitation, mechanics and structures, hydraulics, foundation engineering, highway engineering.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Eng. 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 27, General	4	Physics 28, General	4
Civ. Engin. 25, Surveying	5	Elec. Engin. 63, Elements of	3
Military 25	2	Civ. E. 34, Statics	3
Phys. Ed. 33	1	Military 26	2
		Phys. Ed. 34	1

SUMMER (6 WEEKS)

Civ. E. 28, Prop. & Topog. Surveying	3	Civ. Eng. 30, Route Surveying Practice	3
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JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Psych. 26, Econ. 25 or Soc. 28	3	Econ. 25, Psych. 26 or Soc. 28	3
Civ. Eng. 51, Strength of Mat'ls	4	Civ. Eng. 70, Theory of Structures	4
Civ. Eng. 55, Highway Engin.	3	Civ. Eng. 61, Testing Mat'ls.	2
Civ. Eng. 52, Dynamics	3	Civ. Engin. 80, Soil Mechanics	3
Mech. Eng. 65, Thermodynamics*	3	Mech. Engin. 39, Mat'ls. of Constr.*	2
Geol. 50, Engin. Geol.	3	Civ. Eng. 76, Fluid Mechanics	4

* Replaced by military for military majors.

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 71, Structural Design	3	Civ. Eng. 78, Sanitary Engin. II	4
Civ. Eng. 73, Concrete & Masonry	4	Civ. Eng. 90, Contracts, Specif. & Est.	3
Civ. Eng. 77, Sanitary Engin. I	3	Civ. Eng. 92, Professional Sem.	1
Civ. Eng. 81, Foundations	3	Technical Electives (Civ. Eng. 72, 86, 88, 94, 96, Bact. 54, recommended)	6
English 83, Technical Writing	2	Non-Tech. Elective*	3
Non-Tech. Elective*	3		

* Replaced by military for military majors.

ELECTRICAL ENGINEERING

R. R. BROWN, *Adviser*

Electrical engineering is that branch of the profession covering the engineering applications of electricity. It reaches into practically every profession, every branch of activity, either through performance of the tasks involved, or through their measurement and control. Because it is so diversified in its applications, it is considered to be divided into various fields such as power, communications, electronics, illumination, measurements and control and others, each of these having specialized subdivisions.

The undergraduate curriculum is designed to prepare the student for work in any of these fields, and to serve as a basis for specialization in any of them, either in advanced courses or in the field. At the same time, about one-fifth of the student's work is devoted to the humanistic-social courses so that he may have an understanding of the broader aspects of engineering and its relation to other fields of human endeavor.

SUMMER (FOLLOWING FRESHMAN YEAR)

Mechanical Engineering 23, Shop and Civil Engineering, 27, Surveying, 6 credit hours.

SOPHOMORE YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 27, General	4	Physics 28, General	4
Elec. Engin. 41, Fundamentals	4	Civ. E. 34, Statics	3
Military 25	2	Elec. Engin. 42, A.C. Circuits	3
Physical Ed. 33	1	Military 26	2
		Physical Ed. 34	1

JUNIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Engin. 53, D.C. Machinery	4	Elec. Engin. 54, A.C. Machinery	4
Elec. Engin. 55, Electronics	3	Elec. Engin. 56, Appld. Electr.	4
Elec. Engin. 57, Engin. Analysis	3	Elec. Engin. 58, Elec. Network Analysis	3
Mech. Engin. 65, Heat Engin. I	3	Mech. Engin. 66, Heat Engin. II	3
Civ. Engin. 53, Strength of Mat.	3	Civ. Engin. 52, Dynamics	3
Econ. 25, Psych. 26, or Soc. 28	3	English 83, Tech. Writing	2

SENIOR YEAR			
<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Elec. Engin. 83, Transient Analysis	3	Elec. Engin. 92, Prof. Seminar	1
Elec. Engin. 85, Elec. Measurements	3	Elec. Engin. 80, Elec. Communications	
#Mech. Engin. 79, M.E. Lab. I	2	or	
Civ. Engin. 75, Fluid Mechanics	3	Elec. Engin. 82, Power Appl. in Indus.	5
Technical Elective (Elec. Engin. 79, 81, 91)	4	#Ind. Engin. 86, Ind. Mgt.	3
Non-Tech. Elective*	3	Econ. 25, Psych. 26 or Soc. 28	3
		Technical Elective (Elec. Engin. 84, 86, 88, 94, 96, 98)	3 or 4
		Non-Tech. Elective*	3

* Recommended as non-technical electives: Govt. 26, Bus. Law 70, Psych. 86.

Not required of advanced military students.

MECHANICAL ENGINEERING

M. E. BATES, *Adviser*

Mechanical engineering is that branch of the profession which, broadly speaking, covers the fields of heat, power, design of machinery, industrial management and manufacturing problems.

Building upon the foundation laid by the departments of mathematics, physics, and chemistry, the department of mechanical engineering undertakes to show the student how fundamental physical laws apply to this field of the profession. The courses selected give the student thorough training in the basic principles so that particular applications can be mastered in professional practice. Therefore, no attempt is made to give highly specialized instruction.

It must be realized that the modern engineer lives in a time of rapid social and technological change. Only the man who has had a well-balanced cultural and technical program of study can adjust quickly enough to the needs of a continually changing social order. The following curricula emphasize the fundamentals of the four M's of engineering: materials, methods, men, and money, a knowledge of which is vital to the modern engineer.

SUMMER (FOLLOWING FRESHMAN YEAR)

Mechanical Engineering 27 and 28, Shop 6 credit hours.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Math. 31, Integ. Calculus	4	Math. 32, Diff. Equations	4
Physics 27, General	4	Physics 28, General	4
Mech. Eng. 39, Mat'l of Constr.	2	Civ. Eng. 34, Statics	3
Ind. Engin. 25, Prod. Processes	2	Mech. Eng. 46, Fund. of Metallurgy	3
Military 25	2	Military 26	2
Physical Ed. 33	1	Physical Ed. 34	1

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
#English 83, Tech. Writing	2	Psych. 26, Econ. 25 or Soc. 28	3
Civ. Engin. 52, Dynamics	3	Civ. Engin. 76, Fluid Mech.	4
Mech. Eng. 63, Eng. Thermo-dynamics	4	Mech. Eng. 68, Kinematics	3
Elec. E. 61, Principles	4	Mech. Eng. 64, Eng. Thermo-dynamics	3
Civ. Eng. 51, Strength of Mat'ls.	4	Mech. E. 67, Mech. Instr. Lab.	1
Civ. Eng. 61, Testing of Mat'ls.	2	Elec. Eng. 62, Principles	4

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Mech. Eng. 75, Power Plants	3	Psych. 26, Econ. 25 or Soc. 28	3
Mech. E. 77, Internal Combust. Engines	3	Mech. E. 76, Ref. & Air Cond.	3
Mech. Eng. 79, Mech. Eng. Lab.	2	Mech. E. 80, Mech. Eng. Lab.	2
Mech. Eng. 83, Machine Design	3	Mech. E. 86, Adv. Mach. Des.	3
Mech. Engin. 85, Dynamics of Mach.	3	#Technical Elect.†	6
Mech. Eng. 91, Sem.	1	#Non-Tech. Elect. (Bus Law 70 or Psych. 86, Ind. recommended)	3
#Non-Technical Elect. (Am. Govt. 25 recommended)	3	†Mech. Engin. 88, Steady-Flow Mach.	
		†Mech. Eng. 90, Adv. Metallurgy	
		†Elec. Eng. 64, Ind. Electricity	
		†Ind. Engin. 86, Ind. Mgt.	
		†Mech. Eng. 84, Exp. Mech.	
		†Civil Engin. 88, Adv. Stress Analy.	

Not required of advanced military students.

INDUSTRIAL ENGINEERING OPTION

W. H. WEAVER, *Adviser*

Industrial engineering is concerned with the engineering aspects of the organization, operation and management of manufacturing plants. It is based on the premise that the operation of a manufacturing plant is fundamentally an engineering activity. Consequently, the industrial engineering curriculum is built on a foundation of mechanical engineering. To the technical knowledge and scientific attitude developed through the study of engineering is added the study of certain courses in the humanities, in economics, and in management.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Econ. 25	3	Ind. Engin. 82, Work Simplification	2
Mech. Eng. 65, Heat Engin.	3	Mech. Eng. 66, Heat Eng.	3
Civ. Eng. 53, Strength of Mat'ls.	3	Civ. E. 52, Dynamics	3
Elec. Eng. 61, Prin. of Elec. Eng.	4	Elec. Eng. 62, Prin. of E. E.	4
Acct. 25, Prin. of Bus.	3	Acct. 26, Prin. of Bus.	3
Ind. Engin. 51, Ind. Mgt.	3	Mech. Eng. 68, Kinematics	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Civ. Eng. 75, Fluid Mech.	3	Psych. 26 or Soc. 28	3
Statistics 79, Elem.	3	Ind. Engin. 76, Time Study	3
Mech. Engin. 79, Lab. I	2	Ind. Engin. 78, Factory Pl.	2
Mech. Engin. 83, Mach.		Ind. Engin. 80, Budget Con.	3
Design	3	Ind. Engin. 84, Personnel	3
Ind. Engin. 75, Job Evaluation	2	Ind. Engin. 92, Sem.	1
Ind. Engin. 77, Prod. Control	3	Non-Technical Elective	3
Non-Technical Elective	3		

SCHOOL OF HOME ECONOMICS

HELEN S. MITCHELL, *Dean*

General education for living is the main objective of the several four-year curricula in home economics. Non-majors as well as majors, men and women, may elect courses for which they have the necessary prerequisites. Electives during the junior and senior years allow for specialization in preparation for several professional fields: preschool work with children, dietetics, nutrition, teaching of home economics, Extension, and merchandising. The American Dietetic Association sets educational standards for which students in this school may qualify.

When registering for the sophomore year, each student should make a decision as to which home economics curriculum she intends to follow. Some change in emphasis may be made later, but the student is often at a disadvantage if a change in the field of specialization is made later in the college career.

The program of studies for the first two years is largely prescribed.

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Chemistry 1, General	3	Chemistry 2, General	3
Foreign Language	3	Foreign Language	3
Home Ec. 1, Introduction	3	Home Ec. 2, Cloth. Select.	
Physical Education 7	2	& Constr.	3
Hygiene	1	Math. 12	3
Elective	3	Physical Education 8	2

† Elective to be chosen from the following:

Zoology 1, recommended for majors in Foods and Nutrition, Pre-research, or Child Development.

History 5, recommended for majors in Applied Art, Textiles and Clothing, and Merchandising.

Math. 7.

Botany 1.

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Economics 25, Elements	3	Psychology 26, General	3
Chem. 33, Organic	4	Zool. 1 or 35 or	3
Physical Education 27	2	Bact. 31	4
¹ Home Ec. Elective	3	³ Home Ec. 30, Foods	3
² Elective	3	Physical Education 28	2
		² Elective	3

¹ One of the following electives may be taken during the sophomore year: Home Ec. 31, Applied Art; Home Ec. 26, Textiles, Home Ec. 35, Clothing Construction. If none of these is elected Home Ec. 62 should be elected junior year.

² Other electives: Accounting 25, 26; Art 31, 34; Bacteriology, 31; Chem. 29 and 30; Physics 25, 26; Econ. 26; Government 25; Sociology 28; Zoology 35; Language.

³ Merchandising majors may elect Home Ec. 26 in place of Home Ec. 30.

JUNIOR-SENIOR CURRICULA IN HOME ECONOMICS

A student may specialize in one of several fields of Home Economics during the junior and senior years. In consultation with her faculty adviser, each student will choose courses directly related to her objective. To qualify for a B.S. degree in Home Economics a student during the junior and senior years must have at least 15 but not more than 30 credits in the major field and not more than 42 credits in the School of Home Economics. The following courses or their equivalent are required for all majors: Home Economics 51, 52, 75, 77. The following curricula are suggestive. Those interested in other types of professional work should consult with advisers about desirable electives. For students not interested in professional work, a more liberal choice of electives is possible.

CHILD DEVELOPMENT AND FAMILY LIFE EDUCATION

Students interested in child development, nursery school work and social service work should choose this curriculum. The University has arranged for two affiliations for qualified students interested in taking one semester of specialized work elsewhere: with Merrill-Palmer School in Detroit, which specializes in education for home and family life, and with the Nursery Training School in Boston which gives professional training for teaching in nursery schools and kindergartens.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 70, Child Developm't.	3
Psych. 55, Educational	3	Home Ec. 80, Family	3
Electives	6	Electives	6

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 85, Nursery Sch. Mgt.	3	Ed. 85, Practice Teaching	3
Home Ec. 81, Methods	3	Home Ec. 77, Household Mgt.	3
Home Ec. 95, Child Nutr.	3	Home Ec. 90, Seminar	1
Electives	6	Electives	9

FOODS AND NUTRITION AND INSTITUTION MANAGEMENT

This curriculum prepares for such professions as therapeutic or administrative dietitian for nutritionist and meets the requirements of internships approved by the American Dietetic Association. This curriculum is also advised for those interested in home service, food testing and commercial demonstrating related to foods.

Bacteriology 31 and Zoology 35 should be elected sophomore year to satisfy requirements of the American Dietetics Association.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Food Selection	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Household Equip.	3
Home Ec. 81, Methods	3	Home Ec. 70, Child Develop.	3
Chem. 79, Biochemistry	4	Electives	6
Acct. 25, Bus. Acct.	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 71, Retail Fd. Buy.	3	Home Ec. 77, Home Mgt.	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutr. Sem.	1
Home Ec. 91, Institution. Mgt.	3	Home Ec. 92, Inst. Mgt.	3
Home Ec. 93, Experimental Fds.	3	Electives	9
Elective	3		

PRE-RESEARCH IN NUTRITION

This curriculum is planned for the students who wish to prepare for graduate work in nutrition or biochemical research. The course should be planned with the advice of the Dean of the School.

Pre-research majors are advised to elect Physics 25 and 26, and take Chemistry 29 in place of Chemistry 33 in the sophomore year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 51, Organic	4	Chemistry 52, Organic	4
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 75, Ec. of Household	3	Home Ec. 60, Equipment	3
Chemistry 30, Quantitative	4	Electives	6
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Chemistry 79, Biochemistry	4	Home Ec. 77, Home Management	3
Home Ec. 89, Diet Therapy	3	Home Ec. 90, Nutrition Sem.	1
Home Ec. 93, Experimental Foods	3	Home Ec. 98, Special Problems	3
Home Ec. 95, Child Nutrition	3	Electives	9
Elective	3		

HOME ECONOMICS EDUCATION AND EXTENSION

Preparation for teaching demands the same basic courses whether a student plans to teach adults or 4-H club groups in Extension, or young people at the high school or junior high school level. In addition to courses required of all home economics students, certain electives are recommended for those planning for any form of teaching. Courses in speech and writing are important. Electives should be chosen in line with special interests or needs. Teachers should be ready to teach some subject other than home economics if demanded; extension workers need special work in rural sociology and adult education. Camp teaching or apprentice training is recommended between junior and senior year.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Foods	3
Home Ec. 31, Applied Art or		Home Ec. 60, Equipment	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 62, Home Furnish.	
Home Ec. 75, Ec. of Household	3	or	
Home Ec. 81, Methods	3	Home Ec. 26, Textiles	2
Education 53, Tests &		Home Ec. 70, Child Develop.	3
Measrmts.	3	Elective	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Home Ec. 80, Family Life	3
Home Ec. 91, Institution Mgt.	3	Ed. 85, Practice Teaching	3
Home Ec. 93, Experimental		Home Ec. 90, Seminar	1
Foods	3	Electives	9
Psychology 55, Educational	3		
Elective	3		

Any of these junior-senior courses may be taken either year.

Home Ec. 26, 31, 35 may be taken sophomore year.

MERCHANDISING AND RETAILING

This curriculum is planned in cooperation with the School of Business Administration and provides an opportunity for girls interested in preparing for the merchandising field. The junior and senior curriculum includes courses in home economics and in business administration and should be planned with the faculty adviser by the end of the freshman year if possible. Students choosing this program are expected to take Home Economics 31, Accounting 25, and Economics 26 in the sophomore year, and should plan on at least a year of in-service training after college. If the interest is primarily in business, see the Merchandising major under the School of Business Administration.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 35, Clothing Constr.	3	Home Ec. 56, Foods	3
Home Ec. 75, Ec. of Household	3	Home Ec. 52, Nutrition	3
Mktg. 53, Mktg. & Mktg.		Home Ec. 62, Home	
Problems	3	Furnishing	3
Elective	6	Mktg. 54, Salesmanship &	
		Mgt.	3
		Electives	3

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 87, Tailoring	3	Home Ec. 77, Home	
Home Ec. 79, Textile Testing	3	Management	3
Mktg. 71, Retail		Home Ec. 78, Adv. Textile	
Merchandising	3	Design	3
Mktg. 73, Advertising	3	Home Ec. 88, Dress Design	3
Electives	3	Mktg. 72, Mktg. Research	3
		Home Ec. 90, Seminar	1
		Electives	3

TEXTILES, CLOTHING, AND RELATED ART

This curriculum is of interest to students who may wish to use clothing and related art in a general and aesthetic sense for their personal and family development. Students with ability and professional interest in the artistic and technical aspects of textiles, clothing, and related art are encouraged to go further in this field. They are expected to take Home Economics 31 and Home Economics 26 in the sophomore year. Art 31 is recommended.

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 51, Foods	3	Home Ec. 52, Nutrition	3
Home Ec. 35, Clothing Constr.	3	Home Ec. 62, Home	
Home Ec. 75, Ec. of		Furnishing	3
Household	3	Electives	9
Home Ec. 81, Methods	3		
Elective	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Home Ec. 77, Home Mgt.	3	Home Ec. 88, Dress Design	3
Home Ec. 79, Textile Testing	3	Home Ec. 78, Adv. Textile	
Ed. 85, Practice Teaching	3	Design	3
Home Ec. 87, Tailoring	3	Home Ec. 90, Seminar	1
Electives	3	Electives	9

SCHOOL OF NURSING

MARY A. MAHER, *Head and Director*

Preliminary organization steps have been taken toward the development of a School of Nursing. The immediate objectives of this program are a basic nursing education program leading to a baccalaureate degree, and eligibility for certification as registered nurses upon the satisfactory completion of state board examinations.

By the fall of 1954 there will be an adequate curriculum and nursing faculty on the campus at Amherst. An internship, in addition to the four years of undergraduate academic work, is being anticipated. This would provide for extended clinical experience in hospitals, nursing schools, and public health agencies under the direct supervision of the faculty of the University School of Nursing.

DEPARTMENTS OF MILITARY SCIENCE AND AIR SCIENCE AND TACTICS RESERVE OFFICERS' TRAINING CORPS

COLONEL V. F. SHAW, *PMST, Head*

LIEUTENANT COLONEL D. W. PRATT, *PAST, Head*

Under act of Congress, July 2, 1862, the College was required to provide a two-year course in military instruction under a regular army officer. All able-bodied four-year male students were required to take this course. Under act of Congress, June 3, 1916, as amended by act of Congress, September 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following World War I, under an act of Congress, July 19, 1918, the Reserve Officers' Training Corps was in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics. Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a horse cavalry unit. The cavalry unit continued training until June, 1943, at which time the Advanced Course ROTC was discontinued for the duration of World War II. From September, 1943 through June, 1946 the Reserve Officers' Training Corps conducted courses in the basic course, branch immaterial only. In September, 1946, the Advanced Course ROTC was reinstated with an Armored Cavalry unit and an Air Force unit. In the fall of 1951 the two units were reorganized as two separate departments.

The primary objective of the Reserve Officers' Training Corps is to provide systematic training at civil educational institutions and to produce junior officers who have the qualifications and attributes essential to their progressive and continued development as officers in the United States Army Reserve or the United States Air Force Reserve. It is intended to attain the objective during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers.

All male candidates for a degree in the four-year course, except veterans, must take the basic course (Air or Army) of at least three hours a week for two years. Veterans are not required to take the basic course, but are eligible to apply for the Advanced Course.

Specialization by air or service begins in the freshman year. The courses of instruction include theoretical and practical work in all phases of military and air science, such as military organization, hygiene and first aid, weapons, maps, military administration, world political geography, military law and boards, and leadership, drill and exercise of command.

Students who are approved by the president of the University and the professor of military science and tactics or the professor of air science and tactics may elect to take the advanced course in their junior and senior years and may be enrolled in the branch in which they completed the basic course. Advanced students will be commissioned in the organized reserve corps, in their respective service, upon graduation. Honor graduates of the Army unit are offered a commission as a 2nd Lieutenant in the Regular Army. All Air Force graduates may compete for a Regular Commission by entering upon active duty after graduation.

The advanced course, in either service, consists of at least five hours per week, and an advanced summer camp of approximately six weeks during the summer vacation between the two years of the advanced course. Students taking the advanced course are paid by the Department of the Army or Department of the Air Force, at a rate equivalent to the value of the garrison ration, which at the present time is 90c per day, or about \$27.00 per month. The University is granted a clothing allowance of \$100.00 by the United States Government for each advanced course student for the purchase of uniforms. Purchased uniforms become the property of the student upon graduation. Advanced students are paid the pay of the 7th grade (private) while at summer camp.

All basic students are provided with a complete uniform by the department of the Army or the Department of the Air Force. A deposit of \$30.00 is required to cover cost of loss or damage to any articles issued.

DIVISION OF PHYSICAL EDUCATION

W. P. McGUIRK, *Head*

The Division of Physical Education includes the Departments of Athletics, Physical Education for Men, and Physical Education for Women. It offers one major, that in Physical Education for Men.

INTERCOLLEGIATE ATHLETICS

W. P. McGUIRK, *Director*

The following men are in charge of the coaching of the intercollegiate teams:

Charles C. O'Rourke, head coach of football and coach of golf; Chester S. Gladchuk, assistant coach of football and coach of freshman basketball; Robert T. Curran, coach of basketball and coach of freshman baseball; Earl E. Lorden, assistant director of athletics, coach of baseball and assistant coach of football; Llewellyn L. Derby, coach of track, cross

country, and supervisor of sports publicity; Lawrence E. Briggs, coach of soccer and skiing; Melvin G. Massucco, coach of hockey and coach of freshman football and director of intramural sports; Stephen R. Kosakowski, coach of tennis and supervisor of Stockbridge School athletics; Benjamin Ricci, Jr., coach of lacrosse; Joseph R. Rogers, Jr., coach of swimming and pistol team.

PHYSICAL EDUCATION FOR MEN

S. W. KAUFFMAN, *Adviser*

The department of physical education for men offers physical activity courses for four years and the opportunity to major in physical education or teacher coaching.

The activity courses which are required the first two years are designed to assist the student to meet minimum standards of physical health and through regularity and continuity of progressively planned exercises, maintain sound physical condition throughout his college career.

Students are expected to attain minimum physical standards established by the department which includes the ability to swim.

The major in physical education leading to a degree of Bachelor of Science in physical education is designed primarily to train the student for a career as a teacher of physical education. It also includes adequate training in other fields of teaching and coaching of interschool athletics. It is contemplated that physical education majors will be well trained in general scientific and cultural subjects. They are urged to elect advanced military and those planning on teacher-coaching should take additional work in their particular subject matter fields.

The outline of the physical education major follows:

FRESHMAN YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 1, Composition	2	English 2, Composition	2
Speech 3	1	Speech 4	1
Mathematics 7, Algebra and Trigonometry	3	Mathematics 8 or 10	3
Physical Education 21, History	3	Physical Education 22, Aquatics	3
Military 1	3	Military 2	2
Physical Education 5, Activity 1		Physical Education 6, Activity 1	1
<i>Elect two:</i>		<i>Elect two</i>	
Chemistry 1, General	3	<i>(one to be a science):</i>	
Botany 1, Introductory	3	Chemistry 1, General	3
History 5, Mod. European Civiliz.	3	Zoology 1, Introductory	3
		History 6, Mod. European Civiliz.	3
		Government 25, American	3

SOPHOMORE YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
English 25, Humane Letters	3	English 26, Humane Letters	3
Psychology 26, General	3	Econ. 25 or Soc. 28	3
Physical Education 35, Activity	1	Zool. 35, Physiol.	3
Military 25	2	Physical Education 42 First Aid	3
Electives (one to be a science)	9	Military 26	2
		Phys. Ed. 36, Activity	1
		Elective (one to be a science)	3

JUNIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Ed. 83, Secondary Schl.	3	Physical Ed. 54, Secondary Schl.	3
Physical Ed. 53, Elem. Schools	3	Physical Ed. 52, Kinesiology	3
Physical Education 51, Anatomy	3	Physical Ed. 64, Activity	1
Phys. Ed. 55, Tests & Measurmt.	3	Ed. 52, Methods	3
Physical Education 63, Activity	1	Electives	6
Electives	3		

SENIOR YEAR

<i>1st Semester</i>	<i>Credits</i>	<i>2nd Semester</i>	<i>Credits</i>
Education 85, Prac. Teach.	3	Ed. 88, School Curriculum	3
Physical Ed. 75, Org & Adm.	3	Education 85, Pract. Teach.	3
Phys. Ed. 77, Coaching	3	Physical Ed. 78, Coaching	3
Physical Ed. 83, Activity	1	Physical Ed. 84, Activity	1
Electives	9	Electives	9

PHYSICAL EDUCATION FOR WOMEN

RUTH J. TOTMAN, *Adviser*

The courses in physical education for women are planned to provide recreative activity, to develop body grace and efficiency, and to increase health and vigor. No major is available.

The first and second year women students are required to take physical education three times a week and are given two credits for each semester of satisfactory work. Third and fourth year students may elect Physical Education 63, 64, 65, 66. They may elect also Physical Education 42 in the department of physical education for men.

Girls who are restricted from unlimited activity are placed in classes suitable to their ability. Girls who are restricted from all class activity are assigned to rest periods three times a week and receive their regular physical education credit for satisfactory attendance. A similar rest program is substituted for the regular activity program when girls are temporarily incapacitated.

RELIGION

CHAPLAINS POWER, RUCHAMES, AND TEMPLE, *Advisers*

The courses in the history of religion, the articles of belief and the application of religious principles are given by the Counselors in Religion of the three major western faiths and by others designated by the churches represented. They are financially independent of the University although the facilities of the University are available as for other courses.

Courses are offered in this field for the sake of the student who is interested in rounding out his educational program with the acquiring of a mature perspective in religion. The opportunity is offered for the student to gain a wide knowledge of the forces which have been basic to his culture, an understanding of the religious influences in his own life, and an evaluation of the part that religion plays in current social movements.

Students register for these courses at the regular registration period and may do so in addition to a normal semester load. No academic credit accrues from participation in the courses in religion, but the grade is recorded on the student's permanent card in the Registrar's office.

DIRECTORY OF COURSES

This section contains a list of courses offered in the regular sessions of the University. Course descriptions are arranged alphabetically according to subject matter fields. If any course cannot be found readily, refer to the General Index in the back of the catalogue. A separate bulletin will outline those available during the summer. The University reserves the right to withdraw any course for which an insufficient number of students enroll.

Courses are designated by numbers as follows: freshman 1-24 inclusive; sophomore 25-49 inclusive; junior 50-74 inclusive; senior 75-99 inclusive. Odd numbers designate courses given in the first semester, even numbers those offered during the second. Credit is indicated in terms of semester hours. Where possible, the class schedule follows the course description. A complete schedule of class hours is published at the beginning of each semester.

Students are referred to the section on Divisions of Study and Curricula for a statement of graduation requirements and majors available.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

PROFESSOR LINDSEY, PROFESSOR BARRETT,
ASSISTANT PROFESSOR RUSSELL, MR. CALLAHAN

26. (II) ECONOMICS OF AGRICULTURAL PRODUCTION.—

This course considers the principles of production economics. An analysis of specialization, comparative advantage, diminishing, constant, and increasing costs and returns applied to the individual establishment as well as to the nation. A careful study of the combination of the factors of production is made considering the individual's adjustment when operating under monopolistic competition, laissez-faire, and monopoly. Finally, dynamic and static factors are considered in relation to their effects on the individual's production, on the economy of cities and nations, and on the international economy.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. BARRETT.

Prerequisite, Economics 25.

55. (I) MARKETING FARM PRODUCTS.—Not open to students who have taken or are taking Marketing 53. An analysis of present and past systems of assembling, transporting, distributing, and grading agricultural products. Such aspects as

the adjustment of production and consumption, price formation, channels of distribution, price differentials and margins, public policy, market reporting and forecasting, and a study of the marketing of major agriculture products are considered. Geographic, future, and quality differentials are studied from the agricultural and commercial standpoint. A field trip may be arranged.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

THE DEPARTMENT.

56. (II) THE FUNDAMENTALS OF COOPERATION.—A study of the philosophy and principles of cooperation in Europe and in the United States. The history of cooperation, legal consideration, management, financing, membership relations, methods of formation, sales methods and policies are given full attention. Progress in the cooperative marketing of different agricultural products is studied.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. CALLAHAN.

57. (I) AGRICULTURAL CREDIT AND LAND APPRAISAL (1954-55).—A study of the development, use, functions, and operations of public and private credit institutions which are available to agriculture. Special emphasis is given to the practical aspects of credit policy and land appraisal. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

71. (I) AGRICULTURAL ECONOMIC THEORY (1955-56).—The course is a comparative and critical study of the significant contributions of the leading economists to the theory of agricultural economics from the time of Adam Smith to the present. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

75. (I) FARM ORGANIZATION AND MANAGEMENT.—This course analyzes the functions of the farmer as a business proprietor. Both the external and internal economic forces affecting the farm business are considered, such as selection and combination of factors of farm production, choice and combination of farm enterprises, the economical use of funds, the nature of farming costs, adjusting farm production to markets and prices, and the management of equipment and labor.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. BARRETT.

Prerequisite, Agricultural Economics 26.

76. (II) ADVANCED FARM ORGANIZATION AND MANAGEMENT.—The use of farm records and accounts as a basis for planning and budgeting is emphasized. Measures of success and factors in success in farming, and work simplification as applied to efficient farm techniques are considered. The last part of the course will be given over to the specific study of selected farms and the practical application of the principles and practices already discussed. Field trips are required at an estimated cost of not over five dollars.

1 class hour; 1 4-hour laboratory period. Credit, 2.

10:00-10:50 Th.; 1:00-4:50 M. Mr. BARRETT.

Prerequisite, Agricultural Economics 75.

78. (II) PRINCIPLES AND PROBLEMS OF LAND ECONOMICS.—A study of the major contributions by outstanding economic writers to theoretical land economics; a review of American land policies; a presentation of the principles, techniques, and objectives involved in modern land use planning; and a discussion of contemporary land problems in the United States. 3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. LINDSEY.

83. (I) ADVANCED FARM OPERATION.—For seniors specializing in agriculture; others by permission of instructor. A study of the efficiency of operations on a specific farm.

3 hours or equivalent.

Credit, 3.

Hours by arrangement.

Mr. BARRETT.

89. (I) 90. (II) SEMINAR IN AGRICULTURAL ECONOMICS.—A study of special problems in agricultural policy, agricultural institutions, market and price analysis.

Hours by arrangement.

THE DEPARTMENT.

STATISTICS

77. (I) ELEMENTARY EXPERIMENTAL STATISTICS.—Primarily for students in psychology, biology, chemistry, agronomy, poultry, animal husbandry, food technology, education, and public health, who are interested in obtaining and handling data of small samples. Chi square, "t" and analysis of variance tests of significance; frequency distribution, averages, dispersion, regression and simple correlation description; and chart and table presentation are the specific fields covered. Students taking this course may not take Statistics 79.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. LINDSEY, Mr. RUSSELL.

79. (I) ELEMENTARY ECONOMICS STATISTICS.—Primarily for students in economics, business administration, mathematics, and industrial engineering, who are interested in

obtaining and presenting the data of large samples. Surveys, tables, charts, frequency distributions, averages, dispersion, standard error and its use, quality control, index numbers, time series, and simple correlation are the specific fields covered. Students taking this course may not take Statistics 77.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. LINDSEY, Mr. RUSSELL.

80. (II) ADVANCED STATISTICS.—This course is primarily devoted to linear and curvilinear multiple correlation analysis. Machine and shortcut graphic methods are used. Some time will also be devoted to probability and analysis of variance.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

1:00-1:50 W.; 1:00-2:50 M. F. Mr. LINDSEY, Mr. RUSSELL.

AGRONOMY

Professor COLBY, Associate Professor DICKINSON, Assistant Professor THAYER, Assistant Professor EVERSON, Mr. ZAK, Mr. BERTINUSON.

2. (II) SOILS.—This is an elementary course relating soils and their management to crop growth. This course is designed to give the student a broad background in soil science and its direct application to practical field problems. The course itself is presented with the object of introducing to the student the properties of soils and their influence upon the production of crops. The laboratory work consists of investigation of the fundamental characteristics of soil and basic principles of fertilizer and liming practices.

2 class hours; 1 2-hour laboratory period. Credit, 3.

8:00-8:50 Tu. Th.; 3:00-4:50 W. or Th.

Mr. EVERSON, Mr. ZAK, Mr. PARSONS.

51. (I) FIELD CROPS.—A study of the field crops of the United States which will include their uses and improvement, with their soil and climatic requirements. Emphasis will be given to the best farm practices of the northeastern states as to rotation, liming, fertilizing, seeding methods, tillage, disease and insect control, and to methods of harvesting and storage. As an individual problem, each student must take a detailed plan of crop production for the actual conditions of some New England farm.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Mr. THAYER.

52. (II) SOIL UTILIZATION.—The relationship of climate and native vegetation to the broader aspects of soil formation is described. Man's use of land resources is connected to show how the agricultural background of settlers has been

active in soil use and abuse. Soil erosion control and its significance to permanent agriculture is considered.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. EVERSON.

57. (I) SOIL FORMATION.—The first part of this course considers those physical, chemical, biological, climate and geological factors involved in soil formation. The relationship of these factors to the kinds of soils formed in the United States is discussed.

3 class hours.

Credit, 3.

Mr. EVERSON.

77. (I) CROP IMPROVEMENT.—Theory and practice of the improvement of field crops by breeding and selection.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

THE DEPARTMENT.

Prerequisites, Agronomy 51, Pomology 52, Zoology 53.

78. (II) FERTILIZERS AND SOIL FERTILITY.—The primary purpose of this course is to relate soils and fertilizers to plant growth. Studies are made of fertilizer practices in the United States and Europe. In the early part of the course consideration is given to the history of fertilizer development, with special emphasis upon early discoveries and causes of failure in early research. Later in the course, studies are made of factors which relate fertilizers and soils to plant growth. Fertilizer formulation technology and practice are considered in detail in the laboratory phase of this course.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 Th.

Mr. EVERSON.

79. (I) SOIL PHYSICS.—For seniors specializing in agronomy. The factors in soil which control tilth and energy relationships and the laws of physics which govern these factors are discussed. This includes heat, light, color, particle size and charge, water and gas movement, energy relationships and other physical factors effecting changes in the soil. The laboratory is used to familiarize the students with various methods used in measuring these important physical factors.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. EVERSON.

81. (I) 82. (II) SPECIAL PROBLEMS IN AGRONOMY.—For seniors specializing in agronomy. This course is designed to acquaint students with agronomic research methods and practical agronomic procedures.

3 2-hour laboratory periods.

Credit, 3.

Mr. COLBY.

84. (II) SOIL CHEMISTRY.—For plant science and soil science students. Fundamental inorganic, organic, and biochemical reactions of soils are discussed and related to plant nutrition and microbiological activities. Colloidal aspects of soil chemical reactions and soil-plant interrelationships will be studied.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites; Chemistry 29; Botany 68; Agronomy 57.

84B. (II) SOIL CHEMISTRY LABORATORY.—Primarily for seniors majoring in agronomy. Methods and techniques used in soil chemistry research and in plant science investigations will be studied. The student will be made familiar with methods of determining exchangeable bases, base exchange capacity, soil phosphate fractionation, and many other determinations peculiar to soil investigations. To be taken concurrently with Agronomy 84.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisites, Chemistry 29, 30; Botany 68; Agronomy 57.

PART II.

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Agrostology.

53. (I) AGROSTOLOGY.—All factors that influence the successful growing of fine turf grasses are studied and correlated to enable the student to have a practical working knowledge of the construction and maintenance of lawns, sports, highway, airport and cemetery turf.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. DICKINSON.

56. (II) AGROSTOLOGY.—This course considers fine turf management as a business and profession. Emphasis is placed on diagnosis and treatment of turf failures; the selection of equipment and supplies and client approach. Field trips and practical exercises are arranged.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. DICKINSON.

ANIMAL HUSBANDRY

Professor RICE, Professor FOLEY, Associate Professor HALE, Assistant Professor ELLIOT, Mr. PERLEY, Mr. CHADWICK.

1. (I) AGRICULTURE.—This course is designed to provide the student with a perspective of the whole field of agriculture. It will orient the student relative to the position of agriculture in relation to other primary and secondary industries. The course will introduce the student briefly to some of the physical characteristics, economic elements, social and

political factors concerned with agricultural pursuits and rural living. It will attempt to assist the student in finding his or her proper niche in the broad field of agriculture.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 M., W., or F.

Mr. FOLEY.

26. (II) BREEDS OF LIVESTOCK AND DAIRY CATTLE JUDGING.—This course considers the economic desirability of thirty breeds of domestic livestock. The origin, history, characteristics and distribution of the breeds of cattle, sheep, swine, and horses commercially important in the United States will be discussed.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 Tu. Th.; 3:00-4:50 F.

Mr. ELLIOT.

26A. (II) JUDGING DAIRY CATTLE.—This is an intensive course in judging dairy cattle and is required of animal husbandry majors. Others may take only by instructor's permission. During April and May, trips to leading dairy cattle breeding farms will be made on Saturdays. The highest ranking students will represent the University in the Inter-collegiate Dairy Cattle Judging contest at the Eastern States Exposition and the Dairy Cattle Congress at Waterloo, Iowa the following fall.

1 2-hour laboratory period, February and March, 3-5 Th.

1 4-8 laboratory period, April and May, Saturday.

Credit, 1.

Mr. ELLIOT.

51. (I) NUTRITION OF FARM ANIMALS.—This course will present the fundamental principles of animal nutrition together with the identification, composition, properties and uses of the common feed stuffs. The application of these basic principles in calculating balanced rations for all classes of livestock will be stressed, followed by practical feeding problems assigned outside the classroom. Feeding practices in use with the university livestock will be analyzed and demonstrated.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

8:00-8:50 M. W. F.; 3:00-4:50 Tu. or Th.

Mr. ELLIOT.

53. (I) ELEMENTS OF MEAT PACKING.—For department majors only. The lectures will discuss the development of the modern packing industry, the history of meat inspection, the principles of meat preservation and the opportunities in this field. Laboratories include the classification of cattle, calves, and swine into proper market classes and grades and slaughtering and dressing operations with animals provided

by the university farm. Wholesale and retail cuts are prepared. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars. 1 class hour; 1 4-hour laboratory period. Credit, 3.
1:00-1:50 W.; 1:00-5:00 M. or F. Mr. HALE.

54. (II) MEAT PROCESSING.—For students not majoring in animal husbandry, by permission of the instructor. A few periods will be devoted to a discussion of the meat packing industry and to the preserving and care of meat products. The remainder will be spent on the classification of meat animals with practice slaughtering and the making of wholesale and retail cuts with stress on identification of retail cuts. A one-day trip through the packing plants of Boston is a requirement of this course and will cost about ten dollars. 1 4-hour laboratory period. Credit, 2.
1:00-5:00 W. or F. Mr. PERLEY.

56. (II) BEEF AND SHEEP PRODUCTION.—This course considers the historical and economic development, present status and probable future trends of beef and sheep production in the United States, especially New England. Consideration will be given to types of production; systems and methods of feeding, management and marketing. In the laboratory, practice will be obtained in fitting and showing as well as certain practical techniques such as dehorning, ear-tagging, castrating, foot-trimming, shearing, etc., and the treatment and prevention of external and internal parasites as well as common ailments. 2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 Tu. Th.; 8:00-9:50 Tu. or 3:00-4:50 Th. Mr. HALE.

56A. (II) GENERAL LIVESTOCK JUDGING AND FIELD TRIPS.—This course is given in conjunction with Animal Husbandry 56 and consists of practice in judging and selecting beef, cattle, sheep, horses, and swine. Throughout the spring, field trips are made to nearby livestock farms and breeding establishments. The five highest ranking students in judging will represent the university in the Intercollegiate Livestock Judging Contest at Eastern States Exposition the succeeding fall. 1 4-hour laboratory period. Credit, 1.
8:00-12:00 S. Mr. HALE.

72. (II) MEAT JUDGING.—This course deals with the classification, grading and judging of carcasses and cuts of beef, veal, lamb and pork. Class work will be carried on at Amherst and nearby packing and distributing plants. The team to represent the university in the Intercollegiate Meat

Judging Contest held in connection with the Eastern States Exposition will be chosen from students in this course.

1 4-hour laboratory period.

Credit, 1.

1:00-4:50 Tu.

Mr. PERLEY.

Prerequisites, Animal Husbandry 53 or permission of instructor.

74. (II) ADVANCED MEATS.—This course deals with the advanced techniques in preparing, preserving, and utilizing the various meat products from cattle, sheep and swine.

2 2-hour laboratory periods.

Credit, 2.

Mr. HALE.

Prerequisite, Animal Husbandry 53 or 54 and permission of instructor.

75. (I) ANIMAL BREEDING.—This course is planned to acquaint the student with the facts of reproductive physiology, with the facts and theories of modern genetics, and to show how such knowledge may be utilized through genetic analysis, selection, and systems of breeding for the creation of more beautiful and more efficient animal types.

3 2-hour periods.

Credit, 4.

1:00-2:50 M. W. F.

Mr. RICE.

Prerequisite, Zoology 53.

76. (II) ANIMAL BREEDING TECHNIQUES.—This course deals with the practical application of the principles of physiology of reproduction and selection to the improvement of farm animals. It includes practice in semen collection and evaluation, artificial insemination procedures and techniques, and in the study of genitalia at different stages of estrus and gestation periods in live and dead animals. Methods of easing and aiding parturition will be discussed and observed.

1 2-hour laboratory period

Credit, 1.

1:00-2:50 Tu. or Th.

Mr. ELLIOT.

78. (II) DAIRY CATTLE PRODUCTION.—This is an intensive course covering all phases of dairy cattle and milk production. It affords an opportunity to seek the solution to the economic, nutritional, genetic, and managerial problems concerned in successful dairying.

4 2-hour laboratory periods.

Credit, 4.

9:00-9:50 Tu. Th.; 1:00-2:50 W., 1:00-2:50 Tu or Th.

Mr. FOLEY.

79. (I) HORSE AND SWINE PRODUCTION.—This course is the same as Animal Husbandry 56 except that it deals with horses and swine instead of beef and sheep.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu. Th.; 1:00-2:50 Th.

Mr. HALE.

79A. (I) ADVANCED LIVESTOCK JUDGING.—This course is devoted entirely to beef, sheep, horse, and swine judging and selection. Field trips will be made to breeding establishments and a team will be selected to represent the University at the Intercollegiate Livestock Judging Contest at the International Livestock Exposition in Chicago and at any other contests in which the University may occasionally or regularly participate.

1 4-hour laboratory period, first half of semester. Credit, 1.
8:00-12:00 S. Mr. HALE.

Prerequisite, Animal Husbandry 56A or permission of instructor.

81. (I) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period. Credit, 1.
3:00-4:50 Tu. or Th. Mr. FOLEY.

82. (II) SEMINAR.—For Animal Husbandry majors.

1 2-hour laboratory period. Credit, 1.
3:00-4:50 Tu., W., or Th. Mr. RICE.

83. (I) ADVANCED MEAT JUDGING.—This course is a continuation of Course 72. The team to represent the University in the Intercollegiate Meats Judging Contest held in connection with the International Livestock Exposition will be chosen from students in this course.

1 4-hour laboratory period, first half of semester. Credit, 1.
1:00-4:50 Tu. Mr. PERLEY.

Prerequisite, Animal Husbandry 72 or permission of instructor.

91. (I) GENETICS AND EUGENICS.—This course, open to students other than those specializing in animal husbandry, deals with the general problems concerned in human reproduction and inheritance. The main topics studied will consist of the physiology of reproduction, the physical basis of inheritance, and the mode of transmission of human characteristics. Consideration will also be given to such questions as the causes of variation, the relative importance of genetic and environmental influences, the mechanism of sex determination as well as population trends, differential birth rates, sterilization, and kindred eugenic problems.

3 class hours. Credit, 3.
9:00-9:50 M. W. F. Mr. RICE.

ART

Instructors in Landscape Architecture.

27. MODELING.—A course in elementary modeling, of seeing, analyzing, and reproducing form in clay and modeling wax to develop sculptural technique.

6 laboratory hours. Credit, 3.
Mr. McLINDON.

28. MODELING.—A continuation of Course 27 in advanced design and the making of plaster casts from original problems in small sculpture, such as plaques, masks, and medals or other such pieces.

6 laboratory hours.

Credit, 3.

Mr. McLINDON.

Prerequisite, Art 27.

31. (I) ELEMENTARY DESIGN.—For women. Elementary principles of design as applied to textiles, fabrics, interior decorations, etc.

3 2-hour laboratory periods.

Credit, 3.

Mr. MACIVER.

33. (I) FREEHAND DRAWING.—A non-professional course in elementary drawing and painting in various media in black and white. The work is more or less personal and is adapted to the individual capacities and backgrounds of each student as far as possible.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

34. (II) FREEHAND DRAWING.—This non-professional course is essentially one in which the use of color is stressed in various media, freehand drawing is emphasized and paintings in still-life and landscape subjects are produced.

6 laboratory hours.

Credit, 3.

Mr. MACIVER.

75. (I) ART APPRECIATION.—An analysis of the principles of critical judgment underlying the fine arts, leading toward the enjoyment of art and its application to every day life.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. OTTO.

78. (II) EARLY AND MEDIEVAL ART.—An appreciative survey of art and history from early times to the present. Works in painting, sculpture, architecture, and the minor arts are examined in the light of their contributions to the history of civilization, and to the development of art forms.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. HAMILTON.

BACTERIOLOGY AND PUBLIC HEALTH

Professor FRANCE, Associate Professor GARVEY, Associate Professor PERRIELLO, Assistant Professor CZARNECKI, Mr. MANDEL, Mr. WISNIESKI, Mr. LARKIN in cooperation with Dr. WALTER W. LEE, State District Health Officer; Mr. ERNEST A. SNOW of the Division of Sanitary Engineering of the Massachusetts Department of Public Health; Mr. JOEL COHEN, Springfield Hospital, Consultant.

31. (I) and (II) **INTRODUCTORY BACTERIOLOGY.**—Designed to present to students interested in general science, agriculture, horticulture, and home economics the fundamental concepts of bacteriological science; make microorganisms real and significant; and demonstrate their importance in the problems of agriculture, general science, industry, public health, and medicine. The laboratory work covers the use and care of the compound microscope, the preparation of culture media, methods of sterilizing equipment, the isolation and aseptic handling of pure cultures, simple and differential staining, bacterial classification and differential studies on type species of pathogenic and non-pathogenic bacteria.

2 class hours; 2 2-hour laboratory periods. Credit, 4.

12:00-12:50 M. F. or Tu. Th.; 1:00-2:50 or 3:00-4:50 M. F. or Tu. Th. Mr. CZARNECKI, Mr. FRANCE, or Mr. LARKIN.

51. (I) 52. (II) **ADVANCED BACTERIOLOGY.**—A continuation of introductory bacteriology. Studies on bacterial metabolism and the influence of environmental factors on growth and viability. The identification and differentiation of bacterial species by morphological, cultural, physiological, and serological studies; disinfectants and antibiotics. The combined courses give to the student not only a comprehensive picture of various forms of existing bacteria but develop a specialized technique for their cultivation, isolation, and identification.

2 3-hour laboratory periods. Credit, 3.

1:00-3:50 Tu. Th. MISS GARVEY.

Prerequisite, For 51, Bacteriology 31; for 52, Bacteriology 51.

54. (I) and (II) **WATER AND SEWAGE BACTERIOLOGY.**—For students majoring in Engineering. Elementary bacteriology with emphasis placed upon the importance of bacteria found in water and sewage. Work will include routine analysis used in the examination of water and sewage and in the laboratory control of water and sewage treatment plants.

2 3-hour laboratory periods. Credit, 3.

2:00-4:50 Tu. Th. Mr. PERRIELLO.

Prerequisite, Civil Engineering 77 or permission of the instructor.

55. (I) **FUNDAMENTALS OF SOIL MICROBIOLOGY.**—This course is designed for students majoring in agricultural and related fields. Subjects included will be: fundamental laboratory procedures and techniques; quantitative and qualitative microbiological analysis of various types of soils; studies on the carbon and nitrogen cycles as affected by soil microorganisms.

2 3-hour laboratory periods. Credit, 3.

Mr. FRANCE.

56. (I) and (II) METHODS FOR BACTERIOLOGICAL PREPARATIONS.—This course is intended for students majoring in bacteriology and public health. The material given in the course includes methods of preparation and sterilization of culture media and equipment, the preparation of stains and reagents, and the use, care and repair of laboratory instruments.

2 2-hour laboratory periods.

Credit, 2.

THE STAFF.

81. (I) GENERAL APPLIED BACTERIOLOGY.—This course is designed to give the student a working knowledge of routine and special tests used in present day applied bacteriology. Subjects receiving consideration are: methods for determining the sanitary quality of milk and milk products, water and shellfish; eating and drinking utensils; and air.

1 class hour; 2 3-hour laboratory periods.

Credit, 4.

1:00-3:50 M. F. or 1:00-3:50 W.; 9:00-11:50 S.

Mr. FRANCE.

Prerequisite, Bacteriology 51 or permission of the instructor.

82. (II) FOOD BACTERIOLOGY.—Consideration will be given to (1) bacteriological principles which apply to the preservation, fermentation and spoilage of foods, (2) the sanitary examination of foods, (3) the causes of food poisoning, and (4) microbiological assays.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 M. F. or Tu. Th.

MISS GARVEY.

Prerequisite, Bacteriology 51 or permission of the instructor.

85. (I) BACTERIOLOGY (IMMUNOLOGY).—Admission by permission of the instructor. This course includes consideration of host reactions which favor the prevention and cure of disease; qualitative and quantitative estimations of toxins and antitoxins; the use of biological products such as antigens and immune sera in differential bacteriology and in disease diagnosis; and a consideration of isohemagglutinins as determinants of blood groups.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 M. F.

MISS GARVEY.

90. (II) SANITARY BACTERIOLOGY.—A detailed study of public health laboratory methods. Practical application of methods will be made through field studies.

1 4-hour and 1 2-hour laboratory period.

Credit, 3.

1:00-4:50 M., 1:00-2:50 F.

Mr. FRANCE.

Prerequisite, Bacteriology 81.

92. (II) CLINICAL LABORATORY METHODS.—This course is designed for students majoring in medical technology. The

purpose of the course is to familiarize the student with routine clinical laboratory procedures.

1 4-hour laboratory period.

Credit, 3.

1:00-4:50 W., 3:00-4:50 F.

Mr. FRANCE.

Prerequisites, Bacteriology 85; Zoology 35, 69.

93. (I) 94. (II) PROBLEMS.—Qualified seniors who have obtained permission from the department may arrange for independent work on special problems in bacteriology.

Credit, 3.

THE DEPARTMENT.

Public Health

61. (I) 62. (II) GENERAL AND COMMUNITY SANITATION.—A study of the problems of general and community sanitation. Subjects discussed will include insect and rodent control, housing and slum clearance, ventilation, lighting, bathing places, sanitation of eating utensils, nuisances, camp sanitation industrial hygiene, water supplies, sewerage and sewage, refuse and garbage, food and milk sanitation.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th., 12:00-12:50 F. or 10:00-10:50 M. W. F.

Mr. PERRIELLO.

63. (I) INDUSTRIAL HYGIENE AND SANITATION.—A comprehensive study of the practices and principles of industrial processes which may constitute problems in sanitation; industrial wastes, smoke abatement, and the health of the worker. Subject matter includes organization of programs and the formation of policies for the inspection of sanitary and mechanical facilities of factories, food processing plants and other industries.

3 class hours.

Credit, 3.

Mr. PERRIELLO.

64. (II) MICROSCOPY OF WATER.—A study of microscopic forms of life exclusive of the bacteria. Counting and control of plankton in potable waters. Elements of limnology.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

9:00-9:50 M. F.; 8:00-9:50 or 10:00-11:50 W. Mr. SNOW.

Prerequisite, Bacteriology 31.

66. (I) and (II) PRINCIPLES OF SANITATION.—The application of sanitary engineering and related sanitary sciences to health problems in the environment of urban and rural communities.

2 class hours.

Credit, 2.

11:00-11:50 Tu. Th.

Mr. PERRIELLO.

Prerequisite, Civil Engineering, 77 or permission of the instructor.

84. (II) PUBLIC HEALTH ADMINISTRATION.—Admission by approval of the instructor. The organization, function, and administration of governmental health agencies; the relationship of official and volunteer health agencies; preparation and presentation of lectures, demonstrations, and exhibits. Public health laws, regulations, and sanitary codes, their origin and enforcement.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

MR. PERRIELLO.

86. (II) FIELD STUDIES IN SANITATION.—Trips will be taken into the field for the observation of public health practices in sewerage; sewage treatment and disposal; the production and purification of public water supplies; housing and slum clearance; insect and rodent nuisances; milk production, handling, and distribution; garbage and refuse collection and disposal; slaughter houses and rendering plants; cold storage warehouses; and bakery and restaurant sanitation. A comparative study of urban and rural services will be made. Although transportation will be furnished, students are expected to finance their own meals.

1 class hour; 1 4-hour laboratory period.

Credit, 2.

Hours by arrangement.

Prerequisites, Public Health 61 and 62.

88. (II) EPIDEMIOLOGY AND COMMUNICABLE DISEASE CONTROL.—Admission by approval of the instructor. Consideration of the factors involved in the spread of infections; a detailed discussion of the communicable diseases, their distribution, cause, epidemiology, and means of prevention and control. The use of vaccines, serums and drugs for prevention and treatment. Mass immunization programs.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

MR. LEE.

BOTANY

Professor KOZLOWSKI, Professor TORREY, Professor LIVINGSTON, Assistant Professor BANFIELD, Assistant Professor SPENCER, Mr. SCARBOROUGH, Mr. NICKERSON, Mr. DAVIS.

1. (I) and (II) INTRODUCTORY BOTANY.—The course sets forth a body of facts dealing with the morphology and physiology of plants which is not only a foundation for future professional work in biological science, but of intrinsic value to the educated layman. The topics of seed germination, ecological adaptations, floral structures, taxonomy, botanical history, cytology, wood-anatomy, plant physiology, and plant reproduction receive appropriate elementary treatment. The

lectures attempt to interpret the facts of plant structure and function in the light of the major biological principles.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. LIVINGSTON.

25. (I) THE PLANT KINGDOM.—Selected forms typifying the slimemolds, bacteria, algae, fungi, lichens, liverworts, mosses, fernworts, and seed plants. The course has a two-fold purpose: (1) it is intended for students who desire to extend their knowledge to the principal branches of the plant kingdom, thus rounding out a general course of which Botany 1 constitutes the first part; (2) it is also planned as an introduction to certain advanced courses for which it is prerequisite.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. TORREY.

Prerequisite, Botany 1.

26. (II) SPRING FLORA.—Designed primarily to acquaint the student with the local spring flora through the identification of the commoner tracheate plants (lycopods, horsetails, ferns, gymnosperms, angiosperms) and the families they represent. In addition, laboratory and field work will include the study of native woody plants in the winter condition; the techniques of collection; the use of a standard manual in the identification of plants; and the preparation of a representative herbarium. The course is designed for students majoring in botany, forestry, floriculture, recreational leadership, and wildlife management. Enrolment limited to 40. Expense of required materials approximately \$20.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-8:50 W.; 1:00-2:50 Tu. Th. or 1:00-2:50 M. F.

Mr. LIVINGSTON.

Prerequisite, Botany 1; Botany 25 recommended.

28. (II) PLANT PHYSIOLOGY.—Only for students intending to major in forestry. The processes occurring in plants with special emphasis on tree physiology and its relation to forestry problems.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. KOZLOWSKI.

30. (II) PLANT ANATOMY.—A study of the origin and structure of vegetative and reproductive organs of seed plants.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SPENCER.

51. (I) PLANT PATHOLOGY.—A basic course in plant pathology dealing with the nature, cause and control of plant disease. Particular attention is given to disease symptoms, the phenomena of infection and of parasitism, the sources of

inoculum, the agents of disease transmission, the relation of environment to disease incidence and development and to general principles of plant disease control. The laboratory phase is devoted to intensive study of a relatively few representative diseases induced by bacteria and fungi of the various classes.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
9:00-9:50 W.; 3:00-4:50 Tu. Th. Mr. BANFIELD.

52. (II) ADVANCED PLANT PATHOLOGY (1954-55).—An extension of Course 51. The objective is that of providing the student with a general knowledge of the more common and representative plant disease problems. Students are granted the option in the laboratory of specializing in disease problems in their major field of interest. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
9:00-9:50 W.; 3:00-4:50 Tu. Th. Mr. BANFIELD.

Prerequisite, Botany 51.

58. (II) MICROTECHNIQUE.—A course in the preparation of microscopic mounts including the celloidin and paraffin methods and involving the use of microtomes and of differential stains. Enrolment limited to ten students.

2 2-hour laboratory periods. Credit, 2.
1:00-2:50 Tu. Th. Mr. TORREY.

Prerequisite, Botany 25.

59. (I) 60. (II) THE ANGIOSPERMS (1954-55).—Alternate with Courses 61 and 62. The angiosperms are here treated from the standpoints of their structure and evolution, their taxonomy, their habits and distribution, and their economic or other special appeal to man's interests. Representatives of the dominant families, both temperate and tropical, are studied in the laboratory. The course is designed for students who want a broad knowledge of the flowering plants of the world.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. TORREY.

Prerequisite, Botany 1.

61. (I) 62. (II) THE COMPARATIVE ANATOMY OF GREEN PLANTS (1953-54).—Alternate with Courses 59 and 60. The first semester is devoted to algae and mosses; the second to tracheates, including the extinct forms.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 M. F.; 1:00-2:50 W. Mr. TORREY.

Prerequisite, Botany 25.

63. (I) COMPARATIVE MORPHOLOGY OF FUNGI—BASIDIOMYCETES AND FUNGI IMPERFECTI (1954-55).—The lectures deal with the comparative morphology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
9:00-9:50 F.; 3:00-4:50 M. F. Mr. BANFIELD.

64. (II) COMPARATIVE MORPHOLOGY OF FUNGI—PHYCOMYCETES AND ASCOMYCETES (1953-54).—The lectures deal with the comparative morphology, life history, and habitat of representative species of the important orders and families. The laboratory periods are devoted to the collection, identification, and study of common local forms. Given in alternate years.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 Tu.; 10:00-10:50 Th.; 3:00-4:50 M.
Mr. BANFIELD.

66. (II) GENERAL MYCOLOGY.—A survey course in mycology designed to acquaint the student with the various classes of fungi, the life history and morphology of representative species, their distribution in nature, their significance in plant and animal disease, their utilization in industrial fermentations. The laboratory phase is devoted to a study of common representative forms and practice in the use of keys for their identification.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
11:00-11:50 Tu.; 3:00-4:50 Tu. Th: Mr. BANFIELD.

67. (I) 68. (II) INTRODUCTORY PLANT PHYSIOLOGY.—A study of the processes occurring in plants and their relation to the complex of activities constituting plant growth. Topics include colloidal systems, osmotic phenomena, absorption, transpiration, and internal water relations of plants, photosynthesis, fat and protein synthesis, digestion, translocation, respiration, and growth. This is a basic course for students planning for advanced work in any branch of plant science.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 W.; 3:00-4:50 M. W. or Tu. Th.

Mr. KOZLOWSKI.

75. (I) METHODS IN PLANT PATHOLOGY (1954-55).—A course in the general techniques and specialized methods used in the investigation of plant diseases, including isolation, culture and pathogenicity studies of representative plant pathogens, the preparation and sterilization of various culture media, elementary staining and histological techniques, the use of the microscope, study of fungicides, and

training in elementary photographic procedures. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
2:00-2:50 Tu.; 10:00-11:50 Tu.; 3:00-4:50 F. Mr. BANFIELD
Prerequisite, Botany 51.

77. (I) 78. (II) ADVANCED PLANT PHYSIOLOGY (1953-54).
—Advanced study in physiology. Given in alternate years.
1 class hour; 2 2-hour laboratory periods. Credit, 3.
Hours by arrangement. Mr. KOZLOWSKI
Prerequisites, Botany 67, 68; Chemistry 51,52.

81. (I) PLANT ECOLOGY.—A general survey of the relationship of plants to their environment including a study of environmental factors (autecology)—soil, water, temperature, light, atmosphere, and the biotic factors—and of plant communities (synecology) with special emphasis on the structure and succession of plant communities in North America.
1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. LIVINGSTON.
Prerequisite, Botany 1; Botany 26 recommended.

82. (II) PLANT GEOGRAPHY.—A survey of descriptive and historical plant geography as well as the basic principles governing the natural distributions of plants. Included as topics are problems of dispersal and migration, endemism, species senescence, discontinuous distributions, polyphesis, continental drift, and geographical aspects of polyploidy. The course is designed for advanced undergraduates or qualified graduate students.
2 class hours.

Credit, 2.
Mr. LIVINGSTON.
Prerequisite, Botany 81 or equivalent recommended.

85. (I) 86. (II) PROBLEMS IN BOTANY.—Supervised problem work for qualified students.
Hours by arrangement. Credit, 1-3.
THE STAFF.

89. (I) PLANT CYTOGENETICS.—The interpretation of hereditary phenomena in plants in terms of cell structures. A correlation of plant cytology and genetics which is of applied as well as theoretical importance.
1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. SPENCER.

90. (II) INSECT TRANSMISSION OF PLANT DISEASES.—The intricate interrelationships of insects and microorganisms with particular emphasis on the basic role played by insects in inception, distribution and perpetuation of plant diseases.
3 class hours. Credit, 3.
Mr. BANFIELD.

BUSINESS ADMINISTRATION

Professor KIMBALL, Professor HARDY, Associate Professor COLWELL, Associate Professor VANCE, Associate Professor SMART, Assistant Professor ST. CLAIR, Assistant Professor SINGER, Assistant Professor LUDTKE, Assistant Professor RIVERS, Assistant Professor HEFNER, Mr. LENTILHON, Mr. GILLIS, Mr. ROBINSON.

Accounting.

25. (I) INTRODUCTION TO ACCOUNTING, I.—This course aims to give the student a working knowledge of the principles underlying the gathering, recording, and interpretation of accounting data.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. COLWELL, Mr. HEFNER, Mr. SINGER, Mr. LENTILHON.

26. (II) INTRODUCTION TO ACCOUNTING, II.—This course covers the principles and procedures of corporation accounting, accounting for consignment and installment sales, and financial statement interpretation.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. COLWELL, Mr. HEFNER, Mr. SINGER, Mr. LENTILHON.

61. (I) INTERMEDIATE ACCOUNTING. —An application of accounting principles to problems of income determination and the classification and valuation of assets.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. SINGER.

Prerequisite, Accounting 26.

62. (II) ADVANCED ACCOUNTING.—A continuation of Accounting 61, concerned with the valuation of assets and liabilities, accounting for net worth, statements of application of funds and the analysis of financial statements.

1 class hour, 2 2-hour laboratory periods. Credit, 3.
Mr. SINGER.

Prerequisite, Accounting 61.

64. (II) COST ACCOUNTING.—The use of accounting techniques to determine business costs, including process costs, standard costs, distributive costs and cost problems imposed by government regulation.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. HEFNER.

Prerequisite, Accounting 26.

74. (II) ACCOUNTING SYSTEMS. —The application of accounting procedures to representative types of business including mechanized accounting.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Prerequisite, Accounting 64. Mr. COLWELL.

75. (I) ADMINISTRATIVE ACCOUNTING AND CONTROL.—The preparation and analysis of budgets, reports, and internal checks, using accounting techniques as control devices in business and industry.

3 class hours.

Credit, 3.

Prerequisite, Accounting 26.

Mr. COLWELL.

76. (II) AUDITING.—A course in the verification of accounting records dealing with audit theory and procedure. C.P.A. and American Institute of Accountants examination problems are studied.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Prerequisites, Accounting 62 and 64.

Mr. COLWELL.

Finance

55. (I) FINANCIAL INSTITUTIONS.—A general course which surveys the development and operations of our financial institutions and provides an integrated study of the entire American financial structure.

3 class hours.

Credit, 3.

Mr. KIMBALL, Mr. LUDTKE, Mr. GILLIS.

65. (I) CORPORATION FINANCE.—This course in business finance is concerned with forms of ownership organization, the nature and uses of corporate securities, provision and maintenance of capital, financial expansion, and corporate reorganization.

3 class hours.

Credit, 3.

Mr. KIMBALL, Mr. LUDTKE, Mr. GILLIS.

76. (II) INSURANCE.—A general course concerning risks encountered by individuals and business enterprises and the methods and institutions evolved to insure against loss. Property, casualty, life and other forms of insurance are studied from the point of view of both the insurance carrier and the insured.

3 class hours.

Credit, 3.

Mr. LUDTKE.

81. (I) PROBLEMS IN BUSINESS FINANCE.—A study of problems of financial management of various types of business corporations and the formation of their financial policies.

3 class hours.

Credit, 3.

Mr. LUDTKE.

Prerequisite, Finance 65 or consent of instructor.

82. (II) INVESTMENTS.—The principles and techniques that are useful for the analysis and selection of investment media; investment policies of individuals and institutions.

3 class hours.

Credit, 3.

Mr. LUDTKE.

Prerequisite, Finance 65 or consent of instructor.

Business Law

70. (I) and (II) BUSINESS LAW I.—This course consists of a study of the drawing, reading, and interpretation of contracts, and includes agency, sales, and commercial paper.
3 class hours.

Credit, 3.
Mr. SMART.

72. (II) BUSINESS LAW II.—A continuation of Business Law 70 including the study of the legal aspects of business organization and the laws of public regulation.
3 class hours.

Credit, 3.
Mr. SMART.

Prerequisite, Business Law 70.

Industrial Administration

11. (I) INDUSTRIAL GEOGRAPHY.—A study of the distribution of natural and human resources and the industrial and physiographic bases of the extractive and manufacturing industries.

3 class hours.

Credit, 3.
Mr. VANCE, Mr. RIVERS, Mr. ROBINSON.

63. (I) MANAGEMENT IN INDUSTRY.—A study of the principles connected with the organization and management industrial enterprises.

3 class hours.

Credit, 3.
Mr. VANCE, Mr. RIVERS.

64. (II) PERSONNEL MANAGEMENT.—A study of the principles of the management of labor relations. Attention is focused on procuring, developing, maintaining and using personnel.

3 class hours.

Credit, 3.
Mr. VANCE.

66. (II) TRANSPORTATION AND TRAFFIC.—The development of highway, waterway, railway, and air transportation; the operation and control of transportation agencies; the use of freight tariffs, classifications and routing guides; the functions of industrial traffic departments.

3 class hours.

Credit, 3.
Mr. RIVERS.

80. (II) ADMINISTRATIVE PROCEDURE.—Theory and practice of administrative organization; planning and direction in business situations; formation and execution of business policies; coordinated and effective operations through group action.

3 class hours.

Credit, 3.
Mr. VANCE.

Marketing

53. (I) **MARKETING PRINCIPLES.**—Not open to students who have taken or are taking Agricultural Economics 55. A study of the institutions, methods, and problems concerned with the distribution of industrial and consumer goods.

3 class hours.

Credit, 3.

Mr. HARDY, Mr. ST. CLAIR, Mr. ROBINSON.

54. (II) **SALESMANSHIP AND SALES MANAGEMENT.**—The principles and practices of selling; the management of sales personnel; and the control of sales operations.

3 class hours.

Credit, 3.

Mr. HARDY.

56. (II) **PURCHASING.**—A study of the purchasing problems of industrial enterprises and of their market contacts and their sources of supply.

3 class hours.

Credit, 3.

Mr. ST. CLAIR.

71. (I) **RETAIL MERCHANDISING.**—A study of the operation and productive functions of the business of retailing.

3 class hours.

Credit, 3.

Mr. ST. CLAIR.

72. (II) **MARKET RESEARCH.**—The aims, sources and fact-gathering methods of market research activities. General study and individual research projects.

3 class hours.

Credit, 3.

Mr. ST. CLAIR.

73. (I) **ADVERTISING.**—A study of the techniques and media of advertising, its services to business and the organization and economic functions of the advertising industry.

3 class hours.

Credit, 3.

Mr. HARDY.

74. (II) **NEW ENGLAND MARKETS.**—Individual and group study of the marketing problems of New England industrial enterprises.

3 class hours.

Credit, 3.

Mr. HARDY.

FIELD WORK IN MERCHANDISING.—Open only to students in the Merchandising curriculum who have been assigned to supervised field work positions.

Mr. HARDY.

CHEMISTRY

Professor RITCHIE, Professor FESSENDEN, Professor SMITH,
Associate Professor CANNON, Associate Professor LITTLE,
Assistant Professor RICHASON, Assistant Professor
ROBERTS, Assistant Professor STEIN, Dr. PARROTT*,
Mr. OBERLANDER, Mr. RHYNE, Mr. SCHAFFRATH,
Mr. TYLER, Mr. SCHEUFELE, Mr. CHRISTOFFERS,
MISS KENDROW, Mr. CONRAD, Mr. BENJAMINOV,
Miss JUDGE.

1. (I) 2. (II) GENERAL CHEMISTRY.—A study of the fundamental chemical laws and theories. A considerable amount of descriptive material will be included in connection with discussions of the periodic system, atomic structure, and in various applications of the principles. The object of the course is to give the student a sound scientific training through a course in chemistry. Students who have had no previous work in chemistry will be grouped together in recitation sections so that they may have special attention.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

Mr. FESSENDEN, Mr. RICHASON, Mr. STEIN, Mr. OBERLANDER.

4. (II) GENERAL INORGANIC CHEMISTRY.—For students planning to major in chemistry or chemical engineering, and others who plan to continue the study of this science in preparation for their field of specialization. The course will include ionic equilibria; oxidation and reduction; electrochemistry; the descriptive chemistry of some nonmetallic and metallic elements; the metallurgy of some common metals, and a discussion of the production of some of the more important inorganic chemicals. Applications of atomic structure and the electronic theory of valence to these subjects will be stressed.

2 class hours; 1 quiz hour; 2 2-hour laboratory periods.

Credit, 4.

Mr. FESSENDEN, Mr. RICHASON.

Prerequisite, Chemistry 1.

29. (I) and (II) QUALITATIVE ANALYSIS.—A study of the fundamental principles and laws concerning the behavior of solutions of electrolytes. The laboratory work deals with the characteristic properties, reactions, and the systemic separation and identification of the common cations and anions. The semi-micro technique is used throughout for the analysis of salts, salt mixtures, and alloys. A considerable portion of the laboratory work is devoted to the identification of substances unknown to the student. This course is designed to meet the needs not only of those students specializing in

* On leave of absence for military service.

chemistry, but also of those students specializing in other subjects where inorganic chemistry is of importance.

2 class hours; 6 laboratory hours.

Credit, 4.

8:00-8:50 or 10:00-10:50 Tu. Th.; 8:00-9:50 or 10:00-11:50 M.

W. F. or 1:00-3:50 M. F. or 1:00-3:50 Tu. Th.

Mr. SMITH.

30. (I) and (II) QUANTITATIVE ANALYSIS.—The theory and practice of representative determinations in gravimetric and volumetric analysis are considered in detail together with analytical calculations. The laboratory work emphasizes the techniques required for accurate chemical measurements.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

11:00-11:50 Tu. Th.; 1:00-3:50 M. F. or Tu. Th. or 1:00-3:50

W., 9:00-11:50 S.

Mr. ROBERTS.

Prerequisite, Chemistry 29.

33. (I) and (II) ORGANIC CHEMISTRY.—A short course intended to satisfy the requirements in this field for all students who do not specialize in chemistry.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

9:00-9:50 Tu. Th. S.; 1:00-3:50 M. T. W. or Th.

Mr. SCHAFFRATH.

Prerequisites, Chemistry 1 and 2.

51. (I) 52. (II) ORGANIC CHEMISTRY.—A course in the theory of organic chemistry intended to serve the needs of students who will specialize in chemistry, as well as those who may specialize in other fields where a more comprehensive course is desired than Chemistry 33. The first semester deals largely with compounds of the aliphatic series, while the benzene series is taken up in the second semester. Students electing this course should take both 51 and 52.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

9:00-9:50 M. W. F.; 1:00-3:50 M. W. or F.

Mr. RITCHIE, Mr. CANNON.

Prerequisite, Chemistry 29.

63. (I) CHEMISTRY OF WATER, SEWAGE AND SEWAGE SLUDGE.—Admission by permission of the instructor. The preparation of reagents and standard methods for the analysis of water, sewage and sewage sludge. Lectures and discussions on the sanitary significance of analytical data.

2 3-hour laboratory periods.

Credit, 3.

1:00-3:50 W.; 9:00-11:50 S.

Mr. SNOW.

Prerequisite, Chemistry 30.

65. (I) 66. (II) PHYSICAL CHEMISTRY.—A study of the fundamental theories and laws of physical chemistry, together with the solution of problems involved in their application. The laboratory work will include practice in

making physico-chemical measurements and the preparation of reports.

3 class hours; 1 3-hour laboratory period. Credit, 4.
8:00-8:50 or 11:00-11:50 M. W. F.; 1:00-3:50 M. W. or F.

Mr. FESSENDEN, Mr. SMITH.

Prerequisites, Chemistry 30; Mathematics 30; Physics 26.

77. (I) ADVANCED PHYSICAL CHEMISTRY.—A detailed study of a number of topics such as kinetics, catalysis, chemical thermodynamics and electrochemistry.

3 class hours. Credit, 3.
Mr. STEIN.

Prerequisites, Chemistry 65 and 66.

79. (I) ELEMENTARY BIOCHEMISTRY.—A consideration of the more important facts relating to biological materials and processes. This course is designed primarily for students not eligible for courses 93 or 94. It is not open to chemistry majors and is not offered for graduate credit.

3 class hours; 1 3-hour laboratory period. Credit, 4.
Mr. LITTLE.

80. (II) CLINICAL CHEMISTRY (Blood and Urine Analysis).—Work to be covered will include the collection and preparation of samples for analysis; standardization of glassware and the preparation of reagents; description of colorimeters and the determination of certain significant compounds in the samples. The latter group will include at least sugars, proteins, non-protein, nitrogen, fatty substances and inorganic elements.

1 class hour; 1 2-hour laboratory period. Credit, 2.
Mr. LITTLE.

81. (I) ORGANIC CHEMISTRY.—A rapid and intensive survey of the important reactions of organic chemistry with emphasis on their scope and limitations, recent developments and theoretical aspects. Admission by permission of instructor.

3 class hours. Credit, 3.
9:00-9:50 Tu. Th. S. Mr. CANNON.

Prerequisite, one year of organic chemistry.

82. (II) QUALITATIVE ORGANIC CHEMISTRY.—The characterization of organic compounds by means of physical properties, class reactions and the preparation of suitable derivatives. The laboratory work will involve the identification of a number of simple unknown compounds followed by the separation, purification, and identification of the individual components in several unknown mixtures of organic compounds.

Admission by permission of instructor.
2 class hours; 2 3-hour laboratory periods. Credit, 4.
1:00-1:50 Tu. Th.; 2:00-4:50 Tu. Th. Mr. CANNON.

Prerequisite, one year of organic chemistry.

83. (I) ADVANCED ANALYTICAL CHEMISTRY.—The theory and techniques of special methods of analysis such as colorimetry, potentiometry, microscopy, ion exchange, electro-deposition and other recently developed methods of analysis. Primarily for chemistry majors but open to others with the permission of the instructor.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. ROBERTS.

Prerequisite, Chemistry 30.

86. (II) THEORETICAL INORGANIC CHEMISTRY.—A survey of inorganic chemistry which is largely theoretical and includes such topics as atomic structure, periodic classification and relationships, valence concepts, acid-base theory, and the chemistry of the commercially important elements and their compounds based upon the periodic table.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. SMITH.

Prerequisite, Chemistry 65.

88. (II) HISTORY OF CHEMISTRY.—An historical and biographical study of chemistry and chemists. The aim of the course is: (1) to give the student a comprehensive view of the science as a whole, through a study of the development of new ideas and the establishment of new theories and laws; and (2) to arouse an enthusiastic interest in the subject and an appreciation of the true spirit of scientific research, through a sympathetic presentation of the work and lives of the great chemists who have been the creators of the chemistry of today.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. RITCHIE.

92. (II) INTRODUCTION RESEARCH.—Admission only by permission of the department. The aim of the course is to give the student an opportunity to learn the purpose and methods of research. To each student is assigned some special subject or problem in one of the following fields of chemistry, viz., analytical, biochemical, inorganic, organic, physical.

10 laboratory hours.

Credit, 5.

Hours by arrangement.

THE DEPARTMENT.

93. (I) 94. (II) GENERAL BIOCHEMISTRY.—These courses offer a broad introduction to the general field of biochemistry for students majoring in chemistry or in the biological sciences, and provide a background for more advanced or specialized study in this field.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. LITTLE.

Prerequisites, Chemistry 51 and 52 or their equivalent.

DAIRY INDUSTRY

Professor HANKINSON, Assistant Professor LINDQUIST,
Assistant Professor NELSON, Mr. ———.

25. (I) GENERAL DAIRYING.—This course is introductory to all other courses in dairy industry and gives a general knowledge of the subject to those who wish to take only one course in dairying. The lecture portion includes the importance of the dairy industry, the composition and properties of milk, the secretion of milk, production of quality milk on the farm, methods of processing milk and cream, and the elements of ice cream, butter and cheese making. The laboratory work includes the testing of milk and milk products for fat and acidity, lactometry, and a general study of dairy plant equipment and processes.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

1:00-1:50 Tu. Th.; 2:00-3:50 Tu. or Th.

Mr. HANKINSON.

50. (II) JUDGING DAIRY PRODUCTS.—A study of market standards and grades of dairy products, with practice in judging milk, ice cream, butter, and cheese. The emphasis is on recognizing quality in dairy products, detecting specific defects, and learning the causes and means of preventing common defects. A team is chosen from this class to represent the University in two contests: Eastern States Intercollegiate Dairy Products Judging Contest, and Collegiate Students' International Contest in Judging Dairy Products.

1 2-hour laboratory period.

Credit, 1.

3:00-4:50 F.

Mr. NELSON.

52. (II) MARKET MILK.—A study of the various phases of the market milk industry; sanitary production, transportation, pasteurization and handling in the city plant; marketing, delivery systems, milk and its relation to public health, inspection, milk laws, food value, and advertising. Cultured milk and other milk drinks also are included. Some milk plants are visited, the cost of the trip not exceeding five dollars.

2 class hours; 2 2-hour laboratory periods.

Credit, 4.

8:00-8:50 Tu. Th.; 9:00-10:50 Tu. Th. or 3:00-4:50 Tu. Th.

Mr. LINDQUIST.

75. (I) DAIRY CHEMISTRY.—This course is a particular study of those physical and chemical principles which not only explain the behavior of milk and milk products in the various technological operations, but also provide a basic viewpoint for dairy research. The lectures will include discussions (1) of the constituents of milk in relation to other organic compounds, and (2) the physiochemical aspects of certain dairy phenomena such as foaming, coagulation, etc.

The laboratory work will include many of the tests used commercially and in dairy research, emphasizing the principles and application of both qualitative and quantitative analysis as well as the technique of operating scientific apparatus.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

8:00-10:50 Tu.; 8:00-9:50 Th. Mr. NELSON.

Prerequisites, Dairy 25, Dairy 52, and Chemistry 52 or permission of the instructor.

77. (I) BUTTER AND CHEESE MAKING.—Half of the semester is devoted to butter making; the remainder to cheese making, condensed and powdered milk. The various phases of the butter industry studied are: separators and cream separation; pasteurization, neutralization, and ripening of cream; preparation of starter cultures; churning; marketing and scoring of butter; creamery management. The work in cheese making includes cheddar, cream, Neufchatel, cottage, processed cheeses, etc. The manufacture of condensed milk, powdered milk, and commercial casein is also covered.

2 class hours; 2 3-hour laboratory periods. Credit, 4.

11:00-11:50 W. F.; 1:00-3:50 M. F.

Mr. LINDQUIST, Mr. NELSON.

Prerequisite, Dairy 25.

78. (II) ICE CREAM MAKING.—The course includes a study of the principles and practices of ice-cream making. The effects of such factors as composition, quality, pasteurization, homogenization, aging, and freezing on the finished products are considered. Sherbets, ices, fancy and individual forms, and all flavors of ice cream are studied. Some time is devoted to refrigeration, machinery, delivery equipment, and merchandising methods as they are related to the industry.

2 class hours; 2 3-hour laboratory periods. Credit, 4.

11:00-11:50 W. F.; 1:00-3:50 Tu. Th. Mr. NELSON.

79. (I) 80. (II) SEMINAR.—For students specializing in dairy industry.

1 class hour. Credit, 1.

11:00-11:50 M. THE DEPARTMENT.

ECONOMICS

Professor GAMBLE, Professor MORRIS, Assistant Professor HALLER, Assistant Professor HOWARD, Assistant Professor SCHOEFFLER, Mr. WEINER, Mr. ROTHENBERG.

12. (II) ECONOMIC HISTORY OF THE UNITED STATES.—A study of the significant factors in the economic development of the nation.

3 class hours. Credit, 3.

Mr. HALLER, Mr. HOWARD.

25. (I) and (II) ELEMENTS OF ECONOMICS.—Definitions and introductory principles of production, exchange, and the financial organization of society, with a short survey of the economics of distribution and the use of wealth and income.
3 class hours.

Credit, 3.

THE DEPARTMENT.

26. (II) PROBLEMS OF THE NATIONAL ECONOMY.—A continuation of course 25 with emphasis on the study of wealth and income distribution.

3 class hours.

Credit, 3.

Prerequisite, Economics 25.

THE DEPARTMENT.

53. (I) MONEY, BANKING AND CREDIT.—A critical survey of the development and operation of the monetary and banking systems of the United States.

3 class hours.

Credit, 3.

Mr. GAMBLE.

54. (II) MONEY, INCOME AND MONETARY POLICY. — A study of the relationship between money, income and monetary policy. It includes examination of the relationships between individuals, banks, money markets and central banks.
3 class hours.

Credit, 3.

Mr. GAMBLE.

Prerequisite, Economics 53 or Finance 53.

55. (I) ECONOMICS OF CONSUMPTION.—A study of patterns of consumption, standards of living and the sources and expenditure of individual and family incomes.

3 class hours.

Credit, 3.

Mr. HALLER.

56. (II) BUSINESS FLUCTUATIONS AND FORECASTING.—A study of business fluctuations and an analysis of current business cycle theories.

3 class hours.

Credit, 3.

Mr. SCHOEFFLER.

70. (II) MONOPOLIES.—A study of the growth, development, and social control of monopolies.

3 class hours.

Credit, 3.

Mr. HALLER.

73. (I) MODERN ECONOMIC THEORY.—A study of current theories about value, distribution and prices.

3 class hours.

Credit, 3.

Mr. SCHOEFFLER.

74. (II) CURRENT ECONOMIC PROBLEMS.—An advanced course for those desirous of studying more intensively some current economic problems. Students will be encouraged to pursue lines of individual interest.

3 class hours.

Credit, 3.

Mr. HOWARD.

77. (I) **ECONOMICS OF INTERNATIONAL TRADE (1954-55).**—A study of the policies, principles; and practices of international trade. Given in alternate years.

3 class hours.

Credit, 3.

Mr. WEINER.

78. (II) **PUBLIC FINANCE.**—Principles of public revenues and expenditures with special emphasis on the systems and problems of taxation.

3 class hours.

Credit, 3.

Mr. GAMBLE.

79. (I) **LABOR PROBLEMS.**—An analysis of the background and character of the modern labor problem with special references to the United States. Topics to be considered include: the problems of wages, hours, working conditions and unemployment; the trade union movement; and some agencies for the promotion of industrial peace.

3 class hours.

Credit, 3.

Mr. MORRIS.

80. (II) **LABOR LEGISLATION.**—A study of federal and state legislation affecting labor.

3 class hours.

Credit, 3.

Mr. MORRIS.

83. (I) **SOCIAL CONTROL OF BUSINESS.**—Methods of social control of economic activity including both formal and informal controls.

3 class hours.

Credit, 3.

Mr. HOWARD.

84. (II) **COMPARATIVE ECONOMIC SYSTEMS.**—An examination of the various forms of economic organization that have been tried and proposed with an analysis of the economic institutions of representative current economies.

3 class hours.

Credit, 3.

Mr. SCHOEFFLER.

91. (I) 92. (II) **SEMINAR.**—Research in economic theory; problems of labor, commerce, and industry. If desirable, some other economic study may be substituted.

1 or 2 2-hour conferences.

Credit, 1 to 3.

THE DEPARTMENT.

EDUCATION

Professor PURVIS, Assistant Professor OLIVER, Assistant Professor ROURKE, Assistant Professor MCCARTHY, Assistant Professor WYMAN, Miss O'DONNELL, Mrs. PADEFORD, Mr. TAFT¹.

51. (I) **HISTORY OF EDUCATION.**—Educational movements are traced from early Greece to the present with the aim of

¹ State Supervisor for Agricultural Teacher-Training representing the State Department of Education in the administration of vocational agricultural acts.

better understanding of modern education. This is normally the beginning course for students undertaking work in Education.

3 class hours.

Credit, 3.
Mr. PURVIS.

52. (II) PRINCIPLES AND METHODS OF TEACHING.—By means of discussion, case studies, and current educational literature, teaching ideals and procedures are set up. Application of the general principles are made in the major fields represented by the class. Given also in the one-semester program.

3 class hours.

Credit, 3.
Mr. MCCARTHY.

53. (I) EDUCATIONAL TESTS AND MEASUREMENTS.—The most serviceable tests and scales for measuring achievement are considered; test construction, administration, scoring, and interpretation of results are studied and practiced. Considerable attention is given to preparation of informal tests for diagnostic and grading purposes. Given also in the one-semester program.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. ROURKE.

60. (I) and (II) ELEMENTARY SCHOOL CURRICULUM.—This course is designed to present a picture of the elementary school curriculum from the standpoint of content and methodology. Emphasis will be placed on the unit method and the activity program.

3 class hours.

Credit, 3.
Miss O'DONNELL.

61. (I) and (II) TEACHING OF ELEMENTARY READING AND LANGUAGE ARTS.—This course will discuss and demonstrate emerging methods of preventing and remedying reading difficulties. Attention will be given to the purposes, methods, and materials of oral and written language and reading.

3 class hours.

Credit, 3.
Mr. ———.

62. (I) and (II) TEACHING OF ELEMENTARY ARITHMETIC.—This course will discuss and demonstrate accepted methods and materials in the teaching of arithmetic in the elementary grades. Attention will be given to methods of correlating arithmetic with the total program of the school.

3 class hours.

Credit, 3.
Miss O'DONNELL.

64. (II) PRINCIPLES OF ELEMENTARY EDUCATION.—This course is designed to acquaint the student with the aims, organization, program, pupil population, etc., of the elementary school and the relationship between this level of education and the secondary school level which follows.

3 class hours.

Credit, 3.

Mr. ———.

66. (I) and (II) PREPARATION AND USE OF AUDIO-VISUAL AIDS.— Study is made of available media of audio-visual aids to instruction, construction of visual material, and accepted methods of use.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. WYMAN.

72. (II) VOCATIONAL EDUCATION IN AGRICULTURE.—The course demands certain prerequisites of experience and a definite objective on the part of the student to enter the field of vocational agricultural teaching which makes it necessary for the student to seek permission to enter the course. It is the first of the series of special courses (72, 73, 75) required of candidates for the vocational teacher-training certificate. A survey of vocational education and an introduction to teaching of vocational agriculture at the secondary school level is the basis of the course. Certain information and observations in preparation for the apprenticeship course are offered.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. W. F.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

73. (I) and (II) APPRENTICE TEACHING IN AGRICULTURE.—For a limited number of qualified candidates in vocational education. A full year in absentia normally following the junior year in college, teaching agriculture, horticulture, and related subjects. Candidates should have completed the course in Education 72, and in Education 52, if possible and must apply early to the instructor of the course.

Maximum credit, 6.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

75. (I) TECHNIQUE OF TEACHING VOCATIONAL AGRICULTURE.—By arrangement with the instructor. Preferably this course should follow Courses 72 and 73. It covers the materials, methods, policies, and special requirements of Massachusetts for teaching vocational agriculture and related subjects in high schools and special county schools. This is one

of three courses required of candidates for the agricultural teacher-training certificates.

2 class hours; 1 2-hour laboratory period. Credit, 3.

Mr. OLIVER and VOCATIONAL DIVISION
of STATE DEPARTMENT OF EDUCATION.

79. (I) METHODS IN ADULT EDUCATION.—Admission only by permission of instructor. The beginning Education course for juniors and seniors who are training for extension work and for others interested in teaching adults. Generally accepted methods of group and individual instruction with adults, and methods of developing leaders to carry on the work in the field.

2 class hours; 1 2-hour laboratory period Credit, 3.

Mr. ———.

83. (I) PRINCIPLES OF SECONDARY EDUCATION.—This course presents a picture of the secondary school as a social agency, its relation to elementary and collegiate education, its aims, organizations, administration, curriculum procedures, and such other phases as are necessary to acquaint the student with the predominant level of our educational ladder. Given also in the one-semester program.

3 class hours. Credit, 3.

Mr. MCCARTHY.

85. (I) and (II) OBSERVATION AND PRACTICE TEACHING.—Admission by permission of the Department. An opportunity to do regular teaching in cooperating schools within commuting distance of the University. The student works under the supervision of a teacher with frequent visits from some member of the university staff.

Credit, 3-6.

THE DEPARTMENT.

Prerequisites, Education, 51, 52, 83 or their equivalent.

88. (II) SECONDARY SCHOOL CURRICULUM.—For senior majors in Education. A consideration of learning material and activities and their organization in the subjects which these students are teaching, and the preparation of courses of study in those fields in the light of accepted educational practice. Given also in the one-semester program.

2 class hours; 1 2-hour laboratory period. Credit, 3.

In the One-Semester Program, scheduled as 3 2-hour periods the first and each alternate week.

Mr. ROURKE.

AGRICULTURAL ENGINEERING

Professor STAPLETON, Associate Professor MARKUSON, Assistant Professor TAGUE, Assistant Professor PATTERSON, Mr. POWERS, Mr. PIRA.

51. (I) HOUSE PLANNING.—Plan designs of the small house, will be made. The arrangement of interior equipment, especially in the kitchen, and lighting, heating, water supply, and sewage disposal will be studied, together with a brief history of the house materials, construction methods, equipment, and architectural styles. Consideration will be given to the economics of house building, including financing, and to maintenance and overhead expense.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. MARKUSON.

55. (I) FARM SHOP.—For students in agriculture and horticulture. Laboratory exercises cover instruction and practice in the use of carpenter's tools in construction and in bench work, arc and gas welding, pipe fitting, soldering, use of machinist's tools in machinery repair, and the mixing and placing of concrete. Classroom instruction covers materials of construction and the utilization of local and special materials for these purposes.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. POWERS.

71. (I) FARM POWER.—The study of internal combustion engines used in farm tractors and power units.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. PATTERSON.

Prerequisites, Civil Engineering 52, Mechanical Eng. 65, 68.

72. (II) DRAINAGE AND IRRIGATION ENGINEERING.—This course is an abridgment of Agricultural Engineering 78 for students not majoring in Engineering who do not have the prerequisites for Course 78.

1 class hour; 1 2-hour laboratory period. Credit, 2.
Mr. STAPLETON.

73. (I) FARM STRUCTURES.—A study of the strength and durability of building materials, construction systems and the mechanical principles underlying their use in farm construction. In the drafting room studies will be made of some major farm building and complete working drawings finished in all essential details.

1 class hour; 3 2-hour laboratory periods. Credit, 4.
Mr. STAPLETON.

Prerequisites, Civil Engineering 34, 51; Mechanical Eng. 61.

74. (II) FARM STRUCTURES.—This course is an abridgment of Agricultural Engineering 73 for students not majoring in engineering who do not have the prerequisites for Course 73.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. MARKUSON.

76. (II) AGRICULTURAL MACHINERY.—The study of design and operational problems of agricultural field machinery.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. PATTERSON.

Prerequisites, Civil Engineering 52, Mechanical Eng. 68, 83.

78. (II) DRAINAGE, RECLAMATION AND CONSERVATION.—The course covers the engineering phase of drainage and reclamation. The various systems are studied, complete layouts established in the field, and problems of flow and run-off given.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. STAPLETON.

Prerequisites, Civil Engineering 25, 75 or 76; Agronomy 2.

80. (I) and (II) FOOD PROCESS ENGINEERING.—A study of food processing machinery and instrumentation.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. PFLUG.

82. (II) REFRIGERATION.—Fundamentals in planning and operating a refrigerated storage with particular reference to size, details of construction, cooling load, and refrigerating machinery and accessories. For non-engineering majors.

1 class hour; 1 3-hour laboratory period. Credit, 2.
Mr. PFLUG.

83. (I) 84. (II) AGRICULTURAL ENGINEERING PROBLEMS.—Open only to seniors specializing in agricultural engineering. This course consists of individual problems chosen by the students under guidance of the department.

Hours by arrangement. Credit, 3.
THE DEPARTMENT.

85. (I) RURAL ELECTRIFICATION.—A course devoted to the utilization of electricity in agriculture.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. STAPLETON.

Prerequisites, Electrical Engineering 61, 62.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in agricultural engineering.

1 class hour. Credit, 1.
THE DEPARTMENT.

CHEMICAL ENGINEERING

Professor LINDSEY, Assistant Professor CASHIN, Mr. BATKE.

26. (II) CALCULATIONS.—An introduction to chemical engineering, including problems involving the weights and volumes of material in chemical processing.

2 class hours.

Credit, 2.

Mr. LINDSEY.

Prerequisites, Chemistry 2 or 4; Physics 27.

55. (I) UNIT OPERATIONS I.—Extends the work of Course 26 to thermophysical and thermochemical calculations, and heat and material balances on chemical processes. Covers the unit operations of fluid flow, heat transfer, and evaporation. 3 class hours; 2 2-hour computation periods.

Credit, 5.

Mr. BATKE.

Prerequisites, Chemical Engineering 26; Chemistry 30; Mathematics 30 or 31; Physics 27.

56. (II) UNIT OPERATIONS II.—A continuation of Course 55, including the additional unit operations of distillation, gas absorption, solvent extraction, humidification, crystallization, filtration, mixing, crushing, grinding, and size separation. 3 class hours; 2 2-hour computation periods.

Credit, 5.

Mr. BATKE.

Prerequisite, Chemical Engineering 55.

57. (I) INORGANIC CHEMICAL TECHNOLOGY.—A study of manufacture of some of the important inorganic chemicals. Topics studied include sulfuric acid, nitric acid, hydrochloric acid, ammonia, sodium carbonate, and sodium hydroxide with particular stress on unit operations. Field trips will be included where possible.

3 class hours.

Credit, 3.

Mr. CASHIN.

Prerequisites, Chemistry 30; Physics 28.

58. (II) ORGANIC CHEMICAL TECHNOLOGY.—A study of some of the unit processes involved in the manufacture of organic chemicals. Unit processes studied include nitration, amination, halogenation, oxidation and esterification. Field trips will be included where possible.

3 class hours.

Credit, 3.

Mr. CASHIN.

Prerequisite, Chemistry 51.

75. (S) INSTRUMENTATION.—A detailed study of the underlying principles and practices in indicating, recording and controlling instruments used on industrial process equipment.

4 class hours per week for six weeks.

Credit, 2.

THE STAFF.

Prerequisites, Physics 27, 28; Chemical Engineering 55.

77. (I) ELEMENTS OF UNIT OPERATIONS.—For other than chemical engineering majors. An introduction to some of the unit operations of chemical engineering, especially those which may be of use in other process industries. The emphasis is on the principles and types of equipment, rather than on the quantitative aspects and design.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemistry 30; Physics 27, 28.

81. (I) HEAT-ENERGY RELATIONS.—A study of the energy relations in chemical processes. Includes: types of energy, energy balances, second law, thermodynamic functions, P-V-T relations of fluids, compression and expansion processes.

3 class hours.

Credit, 3.

Mr. BATKE.

Prerequisites, Chemistry 66; Chemical Engineering 56.

82. (II) INDUSTRIAL EQUILIBRIA AND KINETICS.—A study of phase and chemical equilibria and rates of reaction in chemical processes from the industrial point of view.

3 class hours.

Credit, 3.

Mr. BATKE.

Prerequisites, Chemistry 66; Chemical Engineering 81.

88. (S) CHEMICAL ENGINEERING LABORATORY.—A quantitative study of pilot plant size equipment illustrating some unit operations. Special emphasis is placed on the securing of accurate data, correct operating techniques, and on report writing. Field trips will be made when possible.

4 8-hour laboratory days per week for six weeks.

Credit, 3.

THE STAFF.

Prerequisite, Chemical Engineering 56.

89. (I) 90. (II) LABORATORY PROJECTS.—Investigation and report on an elementary chemical engineering problem.

2 4-hour laboratory periods.

Credit, 3.

THE STAFF.

Prerequisites, Chemical Engineering 56, 88.

91. (I) 92. (II) SEMINAR.—Preparation and discussion of professional topics of interest to chemical engineers.

1 class hour.

Credit, 1.

THE STAFF.

93. (I) 94. (II) COMPREHENSIVE PROBLEMS.—The solution of comprehensive problems which require the application and integration of a number of the principles studied in previous courses in chemistry and chemical engineering. Course 93 is a prerequisite for Course 94.

2 class hours; 1 3-hour computation period.

Credit, 3.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 56; Chemistry 52, 66.

95. (I) PROCESS EQUIPMENT DESIGN.—The design of process equipment for the chemical industries: riveted pressure vessels, welded pressure vessels, piping, attachments and closures, etc.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. LINDSEY.

Prerequisites, Chemical Engineering 55; Civil Engineering 53.

98. (II) ADVANCED UNIT OPERATIONS.—A more detailed study of certain unit operations such as unsteady-state heat transfer, and multicomponent-distillation.

2 class hours.

Credit, 2.

Mr. CASHIN.

Prerequisite, Chemical Engineering 56.

CIVIL ENGINEERING

Professor MARSTON, Professor WHITE, Associate Professor OSGOOD, Associate Professor HENDRICKSON, Associate Professor ANDERSON, Assistant Professor FENG, Assistant Professor MARCUS, Assistant Professor GROW, Assistant Professor SHARP,
Mr. O'HARA.

25. (I) SURVEYING.—The theory of surveying for both measurement and layout work, description of field and office computations, notes, and drafting procedure are given in the classroom. Topics covered are use of tape, transit, level, and plane table; methods of carrying out property surveys, layout surveys, computation and field work for simple and compound horizontal and vertical curves, determination of geographic position, determination of azimuth from the Sun and Polaris, and a finished map of a small area.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. HENDRICKSON.

Prerequisite, Trigonometry.

27. (I) and (II) PLANE SURVEYING.—The basic principles of mensuration are discussed in class. Instruction and problems involving the use of tape, transit and level are given in the field, and the preparation of a map of a small area is carried out in the drafting room. Route surveying is considered briefly. This course is not open to civil engineering students.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 5 or 7.

28. (Summer) PROPERTY AND TOPOGRAPHIC SURVEYING.—This course consists of a transit and tape property survey in

which reference to Registry of Deeds records is required, and topographic survey of a selected area using the plane table. Certain advanced topics such as triangulation and conformal coordinate systems are discussed as they relate to the topographic survey.

3 40-hour weeks.

Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Civil Engineering 25 or 27.

30. (Summer) ROUTE SURVEYING PRACTICE.—This practice course consists of a preliminary survey for a short highway location and of the preparation of maps and profile from the data recorded on the survey. The maps are to be used in C.E. 55 in choosing the final location of the route and in estimating earthwork quantities and cost.

3 40-hour weeks.

Credit, 3.

Mr. OSGOOD.

Prerequisite, Civil Engineering 25 or 27.

34. (II) STATICS.—The following topics are considered: equilibrium of forces, friction, first and second moments, center of gravity. Algebraic and graphical methods are covered.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Physics 25; Mathematics 31.

51. (I) STRENGTH OF MATERIALS.—The following topics are considered: simple stresses and strains; combined stresses; torsion; shear and bending moments in beams; stresses and deflections of beams; columns.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Civil Engineering 34; Mathematics 32.

52. (I) and (II) DYNAMICS.—The following topics are considered: kinematics, motion of particles, motion of rigid bodies, work and energy, power, impulse and momentum.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. MARCUS, Mr. GROW.

Prerequisites, Civil Engineering 34; Mathematics 32.

53. (I) STRENGTH OF MATERIALS.—A shortened version of C.E. 51 for electrical and mechanical engineers in the industrial option.

3 class hours.

Credit, 3.

Mr. WHITE, Mr. SHARP, Mr. MARCUS.

Prerequisites, Civil Engineering 34; Mathematics 32.

55. (I) HIGHWAY ENGINEERING.—The design features of highway construction and relative merits of various types of highway surfaces are discussed in class. Plans, profiles, cross sections, and specifications for a short section of highway are prepared.

2 class hours; 1 3-hour laboratory period. Credit, 3.

THE DEPARTMENT.

Prerequisite, Civil Engineering 30.

61. (I) and (II) TESTING OF MATERIALS.—A study of laboratory methods for the determination of the physical properties of engineering materials and their behavior under stress.

1 class hour; 1 3-hour laboratory period. Credit, 2.

Mr. SHARP.

Prerequisite, Civil Engineering 51 or 53.

70. (II) THEORY OF STRUCTURES.—This course treats the analysis of statically determinate structures of wood and steel, with reference to particular types of structures, such as industrial and office buildings, highway and railway bridges.

3 class hours; 1 3-hour laboratory period. Credit, 4.

Mr. OSGOOD.

Prerequisite, Civil Engineering 51.

71. (I) STRUCTURAL DESIGN.—This course is an application of the theory of structures to engineering practice through the preparation of designs and drawings for structural frames, girders and trusses in steel and wood that together make up a complete building frame or bridge. Emphasis is placed upon the design of structural members and joints.

2 class hours; 1 3-hour laboratory period. Credit, 3.

Mr. OSGOOD.

Prerequisite, Civil Engineering 70.

72. (II) ADVANCED STRUCTURAL THEORY.—The analysis of space frames and methods of finding deflections of trusses and beams are studied. Several methods of analysis of statically indeterminate structures are introduced. Application of the theories considered is made in the solution of practical problems during the laboratory periods.

2 class hours; 1 3-hour laboratory period. Credit, 3.

Mr. OSGOOD.

Prerequisite, Civil Engineering 70.

73. (I) CONCRETE STRUCTURES.—This course deals with the general methods of analyzing and designing plain and reinforced concrete structures. Application is made to slabs, beams, girders, columns, walls and foundations for buildings,

retaining walls and bridges. Drawings are prepared for a reinforced concrete building.

2 class hours; 2 3-hour laboratory periods. Credit, 4.
Mr. Osgood.

Prerequisite, Civil Engineering 51.

75. (I) FLUID MECHANICS.—This course is an abridgment of Civil Engineering 76 for electrical and industrial engineering majors.

3 class hours. Credit, 3.
Mr. MARSTON, Mr. MARCUS.

Prerequisite, Civil Engineering 52.

76. (I) and (II) FLUID MECHANICS.—The following topics are considered: properties of fluids, gas laws, viscosity, static pressure, gages, buoyant forces, dynamics of fluids, Bernoulli's theorem, flow in pipes, orifices, nozzles, weirs, and open channels, hydraulic similitude and dimensional analysis.

3 class hours, 1 3-hour laboratory period. Credit, 4.
Mr. MARSTON, Mr. MARCUS, Mr. FENG.

Prerequisite, Civil Engineering 52.

77. (I) SANITARY ENGINEERING I.—This course treats the engineering aspects of public water supply systems and includes the following topics: quantity of water required, hydrology, collection systems, distribution systems, pumping machinery, purification.

3 class hours. Credit, 3.
Mr. FENG.

Prerequisite, Civil Engineering 75 or 76 concurrently.

78. (II) SANITARY ENGINEERING II.—This course treats the engineering aspects of the design, construction, and maintenance of sewerage systems and includes the following topics: hydraulics of sewers, sanitary and storm sewers, sewage treatment, plant design and operation. The laboratory periods are used for inspection trips and the analysis of special problems.

3 class hours; 1 3-hour laboratory period. Credit, 4.
Mr. FENG.

Prerequisite, Civil Engineering 75 or 76.

79. (I) PRINCIPLES OF SANITARY ENGINEERING.—This course is designed for students in the Department of Public Health. It covers phases of Civil Engineering 77 and 78 with consideration of the non-engineering background of the student. Admission by permission of the instructor.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mr. FENG.

80. (II) SOIL MECHANICS.—This course is a study of the mechanical classification of soil based upon field and laboratory work and the validity of these classifications as a means

of predicting soil behavior. The student is guided through case studies in embankment stability, seepage and consolidation.

2 class hours; 1 3-hour laboratory period. Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Geology 50.

81. (I) FOUNDATIONS.—A survey of modern theories and practice in transferring structural loads to earth masses. Pile foundations, spread footings, caissons, and buoyant systems are discussed.

2 class hours; 1 3-hour laboratory period. Credit, 3.

Mr. HENDRICKSON.

Prerequisite, Civil Engineering 80.

86. (II) SANITARY ENGINEERING DESIGNS.—This is a laboratory course devoted to the design of sanitary engineering facilities, water supply and treatment, sewerage and sewage treatment.

1 class hour; 2 3-hour laboratory periods. Credit, 3.

Mr. FENG.

Prerequisites, Civil Engineering 77 and 78, or concurrently.

88. (II) ADVANCED STRESS ANALYSIS.—This course is concerned with the determination of stresses and strains in structural and machine elements.

3 class hours. Credit, 3.

Mr. WHITE.

Prerequisite, Civil Engineering 51 (with a grade of 75).

90. (II) CONTRACTS, SPECIFICATIONS AND ESTIMATING.—A study of the essentials of contracts as applied to business procedures in the construction field, the purposes and make-up of specifications, and the processes of estimating through quantity surveys and unit cost applications.

3 class hours. Credit, 3.

Mr. MARKUSON.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in civil engineering. Current engineering projects are described by student reports. The professional aspect of the civil engineer's work is stressed.

3 class hours. Credit, 3.

THE DEPARTMENT.

94. (II) ADVANCED SURVEYING.—The following topics are included: elements of astronomy, precise methods of surveying, adjustment of observations and the elements of photogrammetry.

2 class hours. 1 3-hour laboratory period. Credit, 3.

Mr. HENDRICKSON.

Prerequisites, Civil Engineering 25, 28.

96. (II) **HYDRAULIC ENGINEERING.**—The analysis and design of hydraulic structures such as storage reservoirs, spillways, dams, levees, and shore protection and channel works are considered.

2 class hours, 1 3-hour laboratory period. Credit, 3.

Mr. MARSTON.

Prerequisites, Civil Engineering 71, 73, 76.

ELECTRICAL ENGINEERING

Professor BROWN, Professor ROYS, Associate Professor
LANGFORD, Assistant Professor MOHN, Assistant
Professor SMITH, Assistant Professor KARLSON,
Assistant Professor LINGO, Mr. KNUDSEN,
Mr. LAWLER.

41. (I) **FUNDAMENTALS OF ELECTRICAL ENGINEERING.**—A study of direct-current circuits in air and iron, magnetic and electrostatic fields, induced and generated voltages, and simple transients in d.c. circuits.

3 class hours; 1 3-hour laboratory period. Credit, 4.

Mr. SMITH, Mr. LINGO.

Prerequisite, Mathematics 6.

42. (II) **ALTERNATING-CURRENT CIRCUITS.**—A study of alternating currents in power and communication circuits, and includes instantaneous voltage and current relationships, vector representation, resonance phenomena, basic network theorems, coupled circuits, single phase and polyphase circuits, power and power measurements, non-sinusoidal waves.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

Mr. LINGO.

Prerequisite, Electrical Engineering 41.

53. (I) **DIRECT-CURRENT MACHINERY.**—This course is a study of direct-current generators and motors with respect to their characteristics, design, operation, applications and control.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. CARLSON.

Prerequisite, Electrical Engineering 41.

54. (II) **ALTERNATING-CURRENT MACHINERY.**—A study of alternating-current generators, motors, transformers, and converters with respect to their design, operation, control and applications.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. KARLSON.

Prerequisites, Electrical Engineering 42, 53.

55. (I) **ELECTRONICS.**—A study of electron motion in electric and magnetic fields, electron tubes and their characteristics, rectifiers, and Class A amplifiers.

2 class hours; 1 quiz hour; 1 2-hour lab. period. Credit, 3.

Mr. MOHN, Mr. SMITH.

Prerequisite, Electrical Engineering 42.

56. (II) **APPLIED ELECTRONICS.**—A continuation of Course 55 and includes a study of electron tubes and associated apparatus in amplifiers, oscillators, amplitude and frequency modulation, detection, multivibrators, and vacuum tube instruments.

3 class hours; 1 3-hour laboratory period. Credit, 4.

Mr. MOHN, Mr. SMITH.

Prerequisite, Electrical Engineering 55.

57. (I) **ENGINEERING ANALYSIS.**—This course is a study of differential equations as applied to electric systems, hyperbolic, Bessel, and Legendre functions, vector analysis and calculus with applications to electricity and magnetism, elliptic integrals, and solutions of field problems by conformal mapping.

3 class hours.

Credit, 3.

Mr. ROYS.

Prerequisites, Mathematics 32; Electrical Engineering 42.

58. (II) **ELECTRICAL NETWORK ANALYSIS.**—A review of fundamental circuit principles and theorems, Fourier Series and Integral, and their applications to distorted waves and pulses, long lines and filters under steady state a-c conditions and traveling waves in transmission systems.

3 class hours.

Credit, 3.

Mr. ROYS.

Prerequisite, Electrical Engineering 42.

61. (I) 62. (II) **PRINCIPLES OF ELECTRICAL ENGINEERING.**—For mechanical, industrial and agricultural engineering students. A study of d-c and a-c circuits, d-c and a-c machines, and basic electronics.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. KNUDSEN.

Prerequisites, Physics 26; Mathematics 32.

63. (I) and (II) **ELEMENTS OF ELECTRICAL ENGINEERING.**—For civil and chemical engineering students. A brief study of d-c and a-c circuits and machines.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SMITH, Mr. LAWLER.

Prerequisites, Physics 26; Mathematics 32.

64. (II) INDUSTRIAL ELECTRICITY.—For mechanical, industrial, and chemical engineering students. A brief study of motor selection and control, protective devices, and electric and electronic applications in industry, including measurement and control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SMITH.

Prerequisites, Electrical Engineering 62 or 63.

79. (I) ELECTRICAL COMMUNICATIONS I.—A study of the fundamentals of communication circuits, including circuit elements, basic network theorems, impedance transformations, equalizers, and bridge circuits.

3 class hours; 1 3-hour laboratory period.

Credit 4.

Mr. LANGFORD.

Prerequisites, Electrical Engineering 42, 58.

80. (II) ELECTRICAL COMMUNICATIONS II.—A continuation of course 56 which includes a study of vacuum tube circuits used in communications, distortion, noise, class B and C power amplifiers, modulation and demodulation practice, oscillator design, transmitters and receivers, antennas and radiation, and electromechanical transducers.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. LANGFORD.

Prerequisite, Electrical Engineering 56.

81. (I) ADVANCED ELECTRICAL MACHINERY.—A continuation of Course 54 and a more advanced study of machines, including the general methods of machine analysis through the use of matrices, symmetrical components, equivalent circuits, and circle diagrams. Emphasis is placed on single-phase and variable-speed a-c motors, converters and inverters, selsyns and amplidynes, and multiwinding transformers.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. KARLSON.

Prerequisite, Electrical Engineering 54.

82. (II) POWER APPLICATIONS IN INDUSTRY.—A study of industrial applications of electrical machines, and includes power supplies to industrial plants, load requirements, types of drives, mechanical requirements of variable speed drives, torque relations in d-c and a-c motors, motor applications and control, and selsyn systems.

3 class hours; 2 3-hour laboratory periods.

Credit, 5.

Mr. KARLSON.

Prerequisite, Electrical Engineering 81.

83. (I) TRANSIENT ANALYSIS.—A study of the transient behavior of electrical, mechanical and thermal systems, and includes the formulation of the ordinary and partial differential equations of dynamic systems and their solution, by the

classical and Heaviside methods and by Fourier and Laplace transforms.

3 class hours.

Credit, 3.
Mr. ROYS.

Prerequisites, Electrical Engineering 42, 57.

84. (II) INDUSTRIAL ELECTRONICS.—A study of special characteristics of the electron tubes of industry, the theory, design and operation of commercial types of circuits utilizing these tubes, including stroboscope, grid-controlled and poly-phase rectifiers, inverters, welding controllers, speed and voltage regulators, high frequency heating circuits, and others.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. ROYS.

Prerequisite, Electrical Engineering 55.

85. (I) ELECTRICAL MEASUREMENTS.—A study of the theory and practice of electrical and magnetic measurements and measurements devices; emphasis is placed on accuracy, precision, and limitations.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Mr. LANGFORD.

Prerequisite, Electrical Engineering 42.

86. (II) POWER SYSTEM NETWORKS.—This course is a study of power system networks including power transfer diagrams, voltage studies, system stability criteria, short-circuit calculations, and protective methods.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. BROWN.

Prerequisites, Electrical Engineering 54, 58.

88. (II) ELECTRIC POWER DISTRIBUTION.—A study of the particular problems relating to the distribution of electric power. Some of the topics considered are radial and loop systems, automatic load transfer, voltage regulation, and short circuit protection.

3 class hours.

Credit, 3.
Mr. BROWN.

Prerequisite, Electrical Engineering 58.

91. (I) SERVOMECHANISMS I.—A study of basic types of error-sensitive control systems; proportional, differential and integral controllers; transient behavior; criteria for error-free operation; and practical electrical and mechanical systems. Classical methods of analysis will be employed.

3 class hours; 1 3-hour laboratory period.

Credit, 4.
Mr. BROWN.

Prerequisite, Electrical Engineering 57 or Mechanical Engineering 85.

92. (II) PROFESSIONAL SEMINAR.—For seniors majoring in electrical engineering. Current engineering developments are discussed through student reports. The professional aspects of the electrical engineer's work is stressed. Instruction is given in the preparation of engineering papers for publication and in their presentation before technical audiences.

1 class hour.

Credit, 1.

Mr. BROWN.

94. (II) ULTRA-HIGH-FREQUENCY TECHNIQUES.—A study of u.h.f. oscillators, amplifiers, transmitters, receivers, transmission systems, antennas, multi-vibrators, trigger and gate circuits, electronic switches, and controls.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. SMITH.

Prerequisite, Electrical Engineering 56.

96. (II) PRINCIPLES OF ELECTRICAL DESIGN.—The fundamentals of electric, dielectric, magnetic and heat-flow systems as applied to the design, rating and life of coils, transformers, machinery and other electrical equipment.

2 class hours; 1 3-hour calculation period.

Credit, 3.

Mr. ROYS.

Prerequisite, Electrical Engineering 54.

98. (II) TELEVISION ENGINEERING.—The application of electronics and radio engineering to the special problems of television. Among the topics considered are the fundamentals of scanning and bandwidth selection; noise limitations associated with primary and secondary emission; iconoscope, image orthocon, image-dissector, and other types of pickup tubes, kinescopes; television transmitters, receivers and antennas.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. LANGFORD.

Prerequisites, Electrical Engineering 56 and 83.

MECHANICAL ENGINEERING

Professor BATES, Professor SWENSON, Professor WEAVER, Associate Professor KEYSER, Associate Professor DITTFACH, Associate Professor LONGSTAFF, Assistant Professor EMERSON,[†] Assistant Professor LAKE,[†] Assistant Professor SOBALA, Assistant Professor WEIDMANN, Mr. COSTA, Mr. LINDNER.

1. (I) ENGINEERING DRAWING.—The purpose of the course is to develop skill in the use of drafting equipment with a working knowledge of orthographic projections, lettering, auxiliary views, sectional views, tracings and pictorial representation of machine parts.

2 3-hour laboratory periods.

Credit, 2.

Mr. WEIDMANN, Mr. GROW.

2. (II) DRAWING AND DESCRIPTIVE GEOMETRY.—During the first part of the course a study of dimensioning, fastenings, and conventional representations is made. The remainder of the course is devoted to descriptive geometry and encompasses a study of graphical methods applicable to engineering problems.

1 class hour; 2 3-hour laboratory periods. Credit, 3.

Mr. WEIDMANN, Mr. GROW.

Prerequisite, Mechanical Engineering 1.

23. (Summer) SHOP.—The course is designed primarily for engineers other than mechanical. Approximately half the semester is spent in welding; in the other half the student gains experience in the machine shop, where he becomes familiar with the various machine and hand tools used in metal working.

3 40-hour weeks.

Credit, 3.

Mr. COSTA.

27. (Summer) SHOP.—The course covers weldability of metals, manual and automatic welding processes. Experience is gained in the manual welding of various metals.

3 40-hour weeks.

Credit, 3.

Mr. PATTERSON.

28. (Summer) MACHINE SHOP.—A knowledge of metal-working equipment is obtained by using the fundamental machine tools such as the lathe, planer, shaper, milling machine and drill press. A reasonable amount of bench work is included. Classroom work is devoted to the theory of machine tool operation, fits, tolerances and measurement.

3 40-hour weeks.

Credit, 3.

Mr. COSTA.

39. (I) and (II) MATERIALS OF CONSTRUCTION.—Properties of engineering materials; failure by (a) exceeding the elastic limit, (b) creep, (c) fatigue, and (d) corrosion. The crystalline nature of metals. Properties and uses of the structural metals, wood, stone, clay products, cementing materials, concrete, plastics, protective coatings, and water.

2 class hours.

Credit, 2.

Mr. KEYSER.

Prerequisites, Chemistry 2 or 4; Physics 27, taken previously or concurrently.

46. (II) FUNDAMENTALS OF METALLURGY.—Physical metallurgy involving crystal structure, solid solutions, diffusion in the solid state, freezing of metals, hardening of metals, annealing, and equilibrium diagrams. These fundamentals are

applied to a study of the iron-iron carbide diagrams, time-temperature-transformation relationships for steel, the heat treatment of steel, and heat-treating equipment. Laboratory work is intended to substantiate some of the principles developed in lecture work and to acquire basic skill in metallographic technique.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. KEYSER

Prerequisites, Mechanical Engineering 39 or Chemistry 66.

63. (I) ENGINEERING THERMODYNAMICS I.—This course is a treatment of the application of the laws of heat to various energy-transforming devices. Topics include ideal and actual cycles of steam, internal combustion engines, and air compressors together with problems pertaining to these machines, energy transformations in fluid flow, variable specific heats and mixtures of gases.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisites, Physics 28; Mathematics 30 or 32.

64. (II) ENGINEERING THERMODYNAMICS II.—A continuation of the work of Course 63. Study will be made of liquids and vapors, thermodynamic cycles, energy transformations and the transfer of heat, together with engineering problems pertaining to these devices.

4 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 63.

65. (I) HEAT ENGINEERING I.—This course is a survey of the field of applied energy and is designed for engineering students outside of the mechanical engineering field. The application of the laws of heat to energy transforming devices is studied, but not as extensively as in Courses 63 and 64. A study will be made of gases, vapors, fuels, combustion, heat transfer, measurement of power, and internal combustion engines.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, Physics 28; Mathematics 6.

66. (II) HEAT ENGINEERING II.—A continuation of the work of Course 65. Air compressors, fans, refrigeration, and air conditioning turbines, jet propulsion and power plants will be studied.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 65.

67. (I) MECHANICAL INSTRUMENTATION LABORATORY.—The calibration and application of instruments used in the testing of mechanical engineering apparatus.

1 3-hour laboratory period.

Credit, 1.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 63 concurrently.

68. (II) KINEMATICS.—Principles of mechanism, including velocity and acceleration diagrams, instant centers, gear teeth and gear trains, cams, and various speed transmissions.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES, Mr. SOBALA.

Prerequisites, Mechanical Engineering 1; Civil Eng. 52.

75. (I) STEAM POWER PLANTS.—This course is a study of the steam power plant, including boilers, stokers, fuels, combustion, steam generation, prime movers, and auxiliary equipment, and engineering problems involved in design and operation.

3 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SWENSON.

Prerequisite, Mechanical Engineering 64.

76. (II) REFRIGERATION AND AIR CONDITIONING.—The course content includes a study of the fundamental principles of thermodynamics as applied to refrigeration and air control. Application of refrigeration to industrial processes and the control of temperature, humidity and motion of air in buildings will be studied.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SWENSON.

Prerequisite, Mechanical Engineering 64.

77. (I) INTERNAL COMBUSTION ENGINES.—A study is made of spark-ignition and compression-ignition engines including design, fuels, carburetion, ignition, combustion, lubrication, cooling, and engine performance. The gas turbine and jet propulsion will be included.

3 class hours.

Credit, 3.

Mr. DITTFACH.

Prerequisite, Mechanical Engineering 64.

79. (I) MECHANICAL ENGINEERING LABORATORY I.—Tests of fuels and lubricants. Performance tests of steam engines and turbines, gasoline and Diesel engines, fans, hydraulic apparatus, refrigeration systems and other typical engineering

equipment. Emphasis on laboratory procedure and orderly presentation of results.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisites, Civil Engineering 76 or 75 concurrently; Mechanical Engineering 64 or 66; Mechanical Engineering 67 for Mechanical Engineering majors.

80. (II) MECHANICAL ENGINEERING LABORATORY II.—

This course continues the work of the first semester in more advanced phases.

2 3-hour laboratory periods.

Credit, 2.

THE DEPARTMENT.

Prerequisite, Mechanical Engineering 79.

83. (I) MACHINE DESIGN.—Principles involved in the design of various machine parts including fastenings, shafts, belts, bearings, gears, and pressure vessels.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES.

Prerequisites, Civil Engineering 51 or 53; Mechanical Engineering 2, 68.

85. DYNAMICS OF MACHINERY.—Gyroscopic effects, governors, dynamic balancing of rotating machinery. Analysis of unbalanced forces in a machine containing parts moving with rotation, reciprocation, and their combination. Elements of vibration theory, vibration isolation, vibration analysis of equivalent masses and shaft systems. Vibration absorbers.

3 class hours.

Credit, 3.

Mr. SOBALA.

Prerequisites, Civil Engineering 52; Mechanical Eng. 68.

86. (II) ADVANCED MACHINE DESIGN.—A continuation of Course 83. Additional elementary parts are studied which combine into the design of complete machines in the latter part of the course.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. BATES.

Prerequisite, Mechanical Engineering 83.

88. (II) STEADY FLOW MACHINERY.—The principles of thermodynamics are applied to steam and internal combustion turbines, condensers, and other heat transfer apparatus.

3 class hours.

Credit, 3.

Mr. SWENSON.

Prerequisites, Mechanical Engineering 64 or 66; Civil Engineering 76.

90. (II) ADVANCED METALLURGY.—Advanced topics in engineering metallurgy, such as the effects of alloying

elements in steel, aluminum, magnesium, and copper alloys. The significant properties of, the fabricating methods for, and the applications of ferrous and nonferrous metals. Admission by permission of instructor.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. KEYSER.

Prerequisite, Mechanical Engineering 46.

91. (I) PROFESSIONAL SEMINAR.—For senior and graduate students only. Presentation of papers on various important subjects in the field of mechanical engineering with principal emphasis on recent developments.

Credit, 1.

THE DEPARTMENT.

94. (I) or (II) EXPERIMENTAL MECHANICAL ENGINEERING.—Special work in mechanical engineering for a senior thesis. Admission by permission of instructor.

Credit, 3.

THE DEPARTMENT.

Industrial Engineering

25. (I) MANUFACTURING PROCESSES.—The methods of producing and fabricating the basic engineering materials: metals, cementing materials, ceramics, plastics, rubber, and lumber. Production methods (excluding machining) of metal parts and their assembly in a typical mass production industry is discussed. Laboratory periods involve inspection trips and movies.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. KEYSER.

26. (Summer) TOOL ENGINEERING.—This course includes the determination of the manufacturing operations necessary to produce a finished product. This is followed by consideration of the principles embodied in the design of jigs, fixtures, dies, and gauges necessary to perform each operation. The economics of tooling as influenced by intermittent or continuous type manufacturing and the effect of volume are also included.

3 44-hour weeks.

Credit, 3.

Mr. COSTA.

51. (I) INDUSTRIAL MANAGEMENT.—A course designed to acquaint the student with the principles of industrial engineering and their application to the solution of the problems of industrial plant operation.

3 class hours.

Credit, 3.

Mr. WEAVER.

75. (I) **JOB EVALUATION.**—A study of the principles used to determine an evaluation of all occupations in order to establish an equitable rating between them, to establish sound wage and salary policies.

3 class hours.

Credit, 2.

Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

76. (I) **TIME STUDY.**—A study of the principles involved in the establishment of production standards and their application in the management functions of cost accounting, estimating, production control, incentives, budgetary control.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. WEAVER.

Prerequisites, Industrial Engineering 75.

77. (I) **PRODUCTION CONTROL.**—A study of the principles used to regulate production activities in keeping with the manufacturing plan.

3 class hours.

Credit, 3.

Mr. EMERSON.

Prerequisite, Industrial Engineering 51.

78. (II) **FACTORY PLANNING AND LAYOUT.**—A study of the principles applying to the determination and development of the physical relationship between plant, equipment and operators working toward the highest degree of economy and effectiveness in operation.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. SOBALA.

Prerequisites, Mechanical Engineering 2; Industrial Engineering 51.

80. (II) **PLANT BUDGETARY CONTROL.**—A study of the principles used to pre-determine expenses for the factors of production and the comparison of results with the estimates to determine and deal with the causes of expense variations as applied by the operating organization in the industrial plant.

3 class hours.

Credit, 3.

Mr. WEAVER.

Prerequisite, Industrial Engineering 51.

82. (II) **WORK SIMPLIFICATION.**—A study of the principles involved in the simplification of means of doing work and in the application and use of these principles.

1 class hour; 1 3-hour laboratory period.

Credit, 2.

Mr. WEAVER.

Prerequisite, Mechanical Engineering 68.

86. (II) INDUSTRIAL MANAGEMENT.—Designed for students other than industrial engineers. A broad course dealing with the many problems encountered in a modern industry. Topics include types of organization, management, plant location, arrangement of equipment, product design, methods of production control, costs, wage payment systems and personnel relations.

3 class hours.

Credit, 3.

Mr. EMERSON.

88. (II) MOTION AND TIME STUDY.—This course covers the combined fields of motion study and time study for junior and senior students outside the industrial engineering field.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SOBALA.

92. (I) PROFESSIONAL SEMINAR.—For seniors and graduate students.

Credit, 1.

ENGLISH

Professor RAND, Professor GOLDBERG, Professor HELMING, Professor TROY,[†] Associate Professor O'DONNELL, Associate Professor VARLEY, Assistant Professor HERRIGAN, Assistant Professor LANE, Assistant Professor ALLEN, Assistant Professor WILLIAMS, Assistant Professor KOEHLER, Assistant Professor KAPLAN, Mrs. WRIGHT, Mrs. HOGAN, Mr. BARRON, Mrs. DUBOIS, Mr. CLARK, Mr. MADEIRA, Mr. MACLAINE, Mr. TUCKER, Mr. HAVEN, Mr. SAVAGE, Mr. COLLINS.

Composition

1. (I) 2. (II) ENGLISH COMPOSITION.—Intended to teach straight thinking, sound structure, clear and correct expression. Scheduled hours include Speech 3. (I) 4. (II).

2 class hours.

Credit, 2.

THE DEPARTMENT.

81. (I) (II) CREATIVE WRITING.—A course in critical and imaginative composition based upon the examples of standard authors and the experience of the student. It provides an opportunity for work in description, narrative, verse and drama as well as in exposition.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, a mark of A or B in English 2 (U. of M.) or permission of instructor.

[†] On leave of absence.

83. (I) (II) TECHNICAL WRITING.—For majors in engineering. A course in factual and inductive exposition with special emphasis upon process reports and theses.

2 class hours.

Credit, 2.
Mr. MADEIRA.

Prerequisites, English 1, 2.

84. (II) TECHNICAL WRITING.—For students not majoring in engineering. A course in factual and inductive exposition with special emphasis upon library research and the preparation of reports, and theses.

3 class hours.

Credit, 3.
Mr. KAPLAN.

Prerequisites, English 1, 2.

Literature

25. (I) 26. (II) HUMANE LETTERS.—A general reading course based upon a chronological selection of masterpieces: classical, continental, and English.

3 class hours.

Credit, 3.
THE DEPARTMENT.

50. (II) CHAUCER.—A study of Chaucer's development and preeminence as a creative artist and an attempt to appreciate his humanism.

3 class hours.

Credit, 3.
Mr. HELMING.

51. (I) THE RENAISSANCE IN ENGLAND.—A study of various aspects of the Renaissance as revealed in such writers as Spenser, Bacon, Sir Thomas Browne, Burton, and Hobbes. Special emphasis is given to Spenser's *Faerie Queene*.

3 class hours.

Credit, 3.
Mr. TROY.

53. (I) LYRICAL POETRY OF THE RENAISSANCE IN ENGLAND (1954-55).—A study of lyrical poets such as Sidney, Campion, Jonson, Herrick, Lovelace, Suckling, Carew, Donne, Herbert, Vaughn, Crashaw, Traherne and Marvell. Special emphasis is given to the "Metaphysical" tradition.

Given in alternate years.

3 class hours.

Credit, 3.
Mr. GOLDBERG.

54. (II) MILTON.—The development of the mind and art of Milton as a Renaissance writer. Emphasis is placed upon *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*.

3 class hours.

Credit, 3.
Mr. GOLDBERG, Mr. HELMING.

55. (I) SHAKESPEARE.—This course is based upon the reading of about twenty-five of Shakespeare's plays, and attempts both to indicate the evolution of the dramatist and to emphasize the various phases of his art.

3 class hours.

Credit, 3.
Mr. RAND.

57. (I) ENGLISH LITERATURE OF THE RESTORATION.—A study of the social problems and literary values of the Restoration period as they reflect in prose, verse, and drama. Emphasis will be placed on the Theater, both tragic and comic, with particular attention to the role of wit, "humours", and satire in the Restoration Comedy of Manners.

3 class hours.

Credit, 3.
Mr. KOEHLER.

58. (II) ELIZABETHAN DRAMATISTS.—A study of English drama from the death of Elizabeth to the closing of the theaters. Special consideration will be given to the plays of Jonson, Beaumont, Fletcher, Webster, Middleton, Massinger, and Shirley.

3 class hours.

Credit, 3.
Mr. O'DONNELL.

59. (I) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A study of the literature of the Augustan Age, with special emphasis on the writing of Swift and Pope.

3 class hours.

Credit, 3.
Mr. TROY.

60. (II) ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—A continuation of English 59, but may be elected independently. A study of the literature of the later Eighteenth Century with special emphasis on the Johnson Circle.

3 class hours.

Credit, 3.
Mr. TROY.

61. (I) ROMANTIC POETRY (1954-55).—A study of the Lake Poets (primarily Wordsworth and Coleridge) and their precursors. Given in alternate years.

3 class hours.

Credit, 3.
Mr. RAND.

62. (II) ROMANTIC POETRY (1954-55).—A continuation of English 61 but may be elected independently. A study of Byron, Shelley and Keats. Given in alternate years.

3 class hours.

Credit, 3.
MISS HARRIGAN.

63. (I) AMERICAN POETRY.—A study of American poetry from Colonial times to 1900, with special emphasis upon the work of Freneau, Bryant, Emerson, Longfellow, Whittier, Poe, Whitman, and Emily Dickinson.

3 class hours.

Credit, 3.
Mr. O'DONNELL, Mr. WILLIAMS.

65. (I) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A study of the chief Romantic prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Coleridge, Lamb, Hazlitt, DeQuincey, Carlyle, and Ruskin.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

66. (II) ENGLISH PROSE OF THE NINETEENTH CENTURY.—A continuation of English 65, but may be elected independently. A study of the chief Victorian prose writers in relation to literary techniques and main currents of epochal thought and feeling. Among the authors treated are Macaulay, Newman, Arnold, Huxley, Pater, and Stevenson.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

67. (I) AMERICAN PROSE.—A course in the chief American prose writers of the nineteenth and twentieth centuries. Among the authors studied are Emerson, Thoreau, Hawthorne, Melville, Mark Twain, Henry Adams, and Henry James.

3 class hours.

Credit, 3.

Mr. O'DONNELL.

68. (II) MODERN DRAMA.—This course traces the development of English and American drama from the time of Ibsen to the present day. Its purpose is to impart an intelligent and enthusiastic interest in the theatre of the twentieth century.

3 class hours.

Credit, 3.

Mr. RAND, Mr. WILLIAMS.

69. (I) VICTORIAN POETRY (1955-56).—A study of Tennyson and Browning. Given in alternate years.

3 class hours.

Credit, 3.

Mr. RAND.

71. (I) BIOGRAPHY.—The history of the biography as a literary type; discussion of leading biographers from Boswell to Maurois, with special emphasis upon the development of the modern biographical method.

3 class hours.

Credit, 3.

Mr. HELMING.

72. (II) THE BIBLE AS LITERATURE.—A study of the King James version of the Bible, with emphasis upon the Hebrew as discernible in translation, the poetic qualities characteristic of Tudor England, and the varied influence of the Bible upon subsequent English poetry.

Mr. RAND.

73. (I) THE NOVEL FROM DEFOE THROUGH THE VICTORIANS. The development of the novel; the reading and discussion of eight or nine great English novels of the eighteenth and nineteenth centuries.

3 class hours.

Credit, 3.

Mr. ALLEN, Mr. HELMING.

74. (II) GREEK CLASSICS IN TRANSLATION.—Readings and discussion of the epics of Homer, representative dramas of Aeschylus, Sophocles, Euripides, and Aristophanes, the "Socratic" dialogues of Plato, and Thucydides' history of the Peloponnesian War. Intended to acquaint students with the famous myths and stories of classical antiquity, and the literary forms and ideas which have contributed most to subsequent literatures.

3 class hours.

Credit, 3.

Mr. HELMING, Mr. TROY.

76. (II) MODERN POETRY.—This course attempts to trace the spirit of twentieth century poetry from such authors as Hardy, Whitman, and Emily Dickinson to those of the present day.

3 class hours.

Credit, 3.

Mr. RAND, Miss HERRIGAN.

77. (I) THE MODERN NOVEL.—An analytical presentation of eleven novels written between 1890 and 1930, in which the expanding form and the extension of critical themes will be stressed.

3 class hours.

Credit, 3.

Mr. VARLEY.

79. (I) LITERARY CRITICISM (1955-56).—A study of major critical attitudes and principles, in relation to philosophic background and to practice. Emphasis is placed upon important critics and theorists from Plato and Aristotle through those of the eighteenth century. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

80. (II) LITERARY CRITICISM (1953-54).—A continuation of English 79, but may be elected independently. Emphasis is placed upon important critics and theorists of the nineteenth and twentieth centuries. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDBERG.

ENTOMOLOGY

Professor ALEXANDER, Professor SWEETMAN, Associate
Professor SHAW, Assistant Professor HANSON,
Dr. SMITH, Mr. FIELD,* Mr. WEIDHAAS

26. (II) GENERAL AND FIELD ENTOMOLOGY.—The lectures are devoted to a brief survey of the entire field of entomology; structure and metamorphosis; the more important methods and materials for control of injurious species; a survey of the more conspicuous and important insects with particular attention to the fauna of New England. A laboratory period will be devoted to the preparation and formation of a collection of insects. Until about April 10th, this work will be done indoors and will consist of lectures and practical work preparatory to the field work after that date. Collections made by the students are studied in later courses.

2 class hours; 1 2-hour laboratory period. Credit, 3.

8:00-8:50 or 10:00-10:50 M. F.; 1:00-2:50 M. Tu. W. Th. F.

Mr. ALEXANDER, Miss SMITH.

51. (I) PESTS OF SPECIAL CROPS.—For students not specializing in entomology who desire a more complete knowledge of the insects connected with their major lines of work. Work in the laboratory consists of identification, life-history studies and control measures of important insect pests. Work of this nature is available on pests of field crops, market-garden crops, fruits, flowers, shade trees and shrubs, forest trees, household articles, domestic animals, and man.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

10:00-10:50 M.; 1:00-2:50 Tu.; 2:30-3:50 Th.

Mr. WEIDHAAS.

Prerequisite, Entomology 26.

53. (I) APPLIED ENTOMOLOGY.—Studies on the more important insect pests, their life-histories, damage, identification, and methods of control. Special attention is devoted to the use of entomological literature, methods of preparing scientific papers, and the general principles of insect control.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

10:00-10:50 W.; 3:00-4:50 M. F.

Mr. SHAW.

Prerequisite, Entomology 26.

55. (II) 56. (II) CLASSIFICATION OF INSECTS.—Laboratory work on the identification of the major orders of insects. In Course 56, the immature stages of insects, with particular stress on their structures and recognition.

3 2-hour laboratory periods.

Credit, 3.

8:00-9:50 Tu. Th. S.

Mr. ALEXANDER, Miss SMITH.

Prerequisites, Entomology 26; Entomology 57, previously or concurrently.

* On leave of absence for military service.

57. (I) INSECT MORPHOLOGY.—The lectures treat of the external and internal anatomy, particularly of the major orders, stress being placed upon the phylogenetic relationships, as background for parallel and subsequent work in taxonomy and physiology of insects.

1 class hour; 3 2-hour laboratory periods. Credit, 4.
10:00-10:50 F.; 1:00-2:50 M. Tu. Th. Mr. HANSON.
Prerequisite, Entomology 26.

60. (II) STRUCTURAL PEST CONTROL.—For students specializing in entomology, especially those desiring to enter the structural pest field, and others interested in gaining knowledge of methods of combating insect and rodent pests. The emphasis will be placed on the control of those pests attacking buildings and other structures, foods, fabrics, and other stored products in private homes or other establishments. The life history, feeding habits, methods of reproduction, and dispersal of the various species will be stressed in so far as these influence control measures.

2 class hours. Credit, 2.
11:00-11:50 M. F. Mr. SWEETMAN.
Prerequisite, Zoology 1; Entomology 26 desirable.

72. (II) FOREST AND SHADE TREE INSECTS.—The lecture work deals with the principles and methods of controlling insects which attack shade trees, forests and forest products. The laboratory periods are devoted to a study of the more important species, their identification, biology, and specific control measures.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
9:00-9:50 W.; 1:00-2:50 M. F.

Mr. HANSON, Mr. WEIDHAAS.
Prerequisite, Entomology 26; 53, 55, 56, and 57 desirable.

74. (II) MEDICAL AND VETERINARY ENTOMOLOGY.—The relationships of insects and their allies to the health of man and animals. The classification, biology and control of these pests is studied in detail.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
10:00-10:50 W.; 3:00-4:50 Tu. Th. Mr. SHAW.
Prerequisite, Entomology 26.

79. (I) ANIMAL ECOLOGY.—Designed for students specializing in entomology, zoology, and related fields. The course deals with the relation of animals to their environment, covering the physical factors as temperature, moisture, light, etc., and biotic factors as neighbors, competitors, predators, etc. Both terrestrial and aquatic communities are studied. The student is shown not only that animals do things, but why they make definite responses to the environmental factors.

Actual measurements of the environmental factors and responses of the animals in the field and laboratory are included.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 M. F.; 3:00-4:50 M.

Mr. SWEETMAN.

Prerequisite, Entomology 26 or Zoology 1 or equivalent.

80. (II) INSECT CONTROL.—The scientific basis of insect control is considered from the chemical, biological, ecological, mechanical, and legislative approaches. Special emphasis is placed on the composition, manufacture, preparation, and reaction of insecticides, and the use of resistant hosts, micro-organisms and the larger parasites and predators that might be used in the control of insects.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 M.; 3:00-4:50 M. F.

Mr. SWEETMAN.

Prerequisites, Entomology 53, 55, and 57; 79 and 81 desirable.

81. (I) PHYSIOLOGICAL ENTOMOLOGY.—A detailed consideration is given to the organ systems, showing the functions such as nutrition, respiration, and growth, and the relationship of physiology to behavior. A portion of the laboratory time will be devoted to assigned individual problems dealing with any phase of insect biology or control and conducted on a research basis.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 Th.; 3:00-4:50 W. F.

Mr. SWEETMAN.

Prerequisite, Entomology 26; 55, 56, and 57 desirable.

87. (I) 88. (II) SPECIAL PROBLEMS IN ENTOMOLOGY.—Problem work in many fields, as apiculture, biological control and insectary practice, insecticides, morphology, and classification. Intended primarily to introduce qualified students to research methods in some branch of entomology. Excess departmental credits are necessary for election.

Hours by arrangement.

Credit, 1, 2, or 3.

THE DEPARTMENT.

Prerequisites, Entomology 26, 53, 55, 57, and should be preceded or accompanied by any other courses in the restricted field of the problem.

89. (I) ENTOMOLOGICAL TECHNIQUES.—Theory and practice in the preservation, preparation, and mounting of insects for study and display. Excess departmental credits are necessary for election.

2 2-hour laboratory periods.

Credit, 2.

Hours by arrangement.

Miss SMITH.

Prerequisites, Entomology 26 and permission of instructor.

90. (II) EVOLUTION.—The phylogeny of plants and animals is outlined at some length in conjunction with consideration of factors and forces influencing and guiding

evolution. Especial consideration is given throughout the course to the implications and applications of evolutionary concept to human behavior, welfare and philosophy.

2 class hours.

Credit, 2.

10:00-10:50 M. F.

Mr. HANSON.

Apiculture

66. (II) INTRODUCTORY BEEKEEPING.—This course is designed to give the student a broad grasp of the general field of apiculture. The lectures cover honeybees and their relatives, biology of the bee, methods of management, diseases, pollination, queen rearing, honey production, and history of beekeeping. The laboratory will acquaint the student with the structure of the bee, equipment for keeping bees and its construction, costs of beekeeping, plants of value for bees, and as much as possible the actual management of bees in the apiary.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 M. F.; 1:00-2:50 M.

Mr. SHAW.

85. (I) ADVANCED BEEKEEPING.—This course is designed for the student who wants more detailed knowledge of the management of bees. It will cover such topics as fall management, wintering, the care of the honey crop, grading and packaging of honey, judging honey, bee diseases, beeswax, and some simple biometrical problems relating to bees. If possible, one or more visits to commercial apiaries will be made.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SHAW.

Prerequisite, Entomology 66.

FLORICULTURE

Professor THAYER, Assistant Professor HUBBARD, Assistant Professor ROSS, Mr. DUNHAM†, Mr. IVES, Mr. CORNFoot.

26. (II) GARDEN MATERIALS.—A study of the annuals, biennials, herbaceous perennials, bulbs, bedding plants, and roses that are valuable for use in floricultural or landscape gardening work. Methods of propagation, culture, and uses of the various plants are considered as well as identification of materials.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

11:00-11:50 M. F.; 3:00-4:50 Th.

Mr. DUNHAM.

51. (I) GREENHOUSE MANAGEMENT.—This course is intended to familiarize students with the methods and principles involved in the management of greenhouses and greenhouse

† On leave of absence.

crops; history and development of the floricultural industry, preparation of soils, fertilizers, potting, watering, ventilation, control of insects and diseases, methods of plant propagation, forcing plants, soilless methods of plant culture. At some time during the semester the members of the class will be required to take a one-day trip to visit large commercial establishments at an approximate cost of five dollars.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 M. F.; 1:00-2:50 F. Mr. THAYER, Mr. DUNHAM.

52. (II) FLORAL ARRANGEMENT.—A study of the principles involving the arrangement and use of cut flowers and plants; funeral designs, basket and vase arrangements, corsages, wedding bouquets, table decorations, home, church, and other interior decorations. A study of color and color harmony as applied to such work. This course is limited to ten students, preference being given to students specializing in floriculture and landscape architecture.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
8:00-8:50 Th.; 1:00-2:50 M. F.

Mr. THAYER, Mr. ROSS.

54. (II) GREENHOUSE CONSTRUCTION AND HEATING.—The location, types, arrangement, construction, cost, equipment, heating, and ventilation of greenhouse structures; the drawing of plans and study of specifications. Special emphasis laid on heating problems.

2 class hours; 1 2-hour laboratory period. Credit, 3.
9:00-9:50 M. F.; 3:00-4:50 M. Mr. THAYER, Mr. DUNHAM.

58. (II) AMATEUR FLORICULTURE.—This course is intended primarily for major students in the School of Home Economics and for other women students. Three phases of floriculture will be considered: (1) the arrangement and use of cut flowers for decorative purposes in the home and elsewhere, (2) house plants, methods of propagation, (3) garden flowers and their uses on the home grounds.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 Tu. Th.; 3:00-4:50 Tu. or 1:00-2:50 Th.

Mr. THAYER, Mr. ROSS.

75. (I) 76. (II) COMMERCIAL FLORICULTURE.—A detailed study of the cultural methods for the important commercial cut-flower crops and potted plants. The marketing of flowers and plants, including the management of wholesale markets and retail stores, a study of systems of record keeping, cost analysis, inventory methods, and other phases of this im-

portant part of the floricultural industry. Trips may be taken to nearby commercial establishments.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 Tu., Th.; 1:00-2:50 Tu. Mr. HUBBARD.

Prerequisite, Floriculture 51.

79. (I) CONSERVATORY PLANTS (1954-55).—Alternates with Course 81 for students specializing in floriculture. A study of the foliage and flowering plants used in conservatory work; methods of propagation; identification of materials.

1 class hour; 1 2-hour laboratory period. Credit, 2.

12:00-12:50 Th.; 1:00-2:50 M.

Mr. THAYER, Mr. DUNHAM.

81. (I) HERBACEOUS GARDENS AND BORDERS.—Alternates with Course 79 for students specializing in floriculture; given annually for students specializing in landscape architecture. This course is a continuation of Course 26 with emphasis on the use of herbaceous materials in various types of planting of borders and gardens.

1 class hour; 1 4-hour laboratory period. Credit, 3.

10:00-10:50 Tu.; 1:00-4:50 Th. Mr. HUBBARD.

Prerequisite, Floriculture 26.

82. (II) SEMINAR.—For seniors specializing in floriculture. Presentation and discussion of research work in floriculture and other related fields and individual problems.

1 class hour; 4 laboratory hours. Credit, 3.

11:00-11:50 W.; laboratory hours by arrangement.

THE DEPARTMENT.

FOOD TECHNOLOGY

Professor FELLERS, Associate Professor LEVINE, Assistant Professor CULBERTSON, Mr. FELICIOTTI, Mr. WESTCOTT, Mr. BALDAUF.

51. (I) INTRODUCTORY COURSE.—This is a general elementary course covering food economics, production, distribution and processing. The applications of fundamental science to the food industries are pointed out. The laboratory exercises cover both the theory and practice of canning, freezing and dehydration. The principles of packaging are considered. Fruit and vegetable products are prepared and graded.

2 class hours; 1 2-hour laboratory period. Credit, 3.

8:00-8:50 Tu., Th.; 1:00-2:50 W. or Th. Mr. FELLERS.

52. (II) FOOD PRODUCTS AND ADJUNCTS.—This is a continuation of Course 51. The laboratory work includes pickles and pickle products, maple products, citrus products, fruit syrups, soups, condiments, and the preservation of meat, fish,

poultry, and vegetables. The properties and uses of sugars, syrups, brines, enzymes, acids, salt, pectin, preservatives and antioxidants are considered. Experience is given in the use and handling of instruments and equipment. Enrollment is limited to 25.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

8:00-8:50 Tu., Th.; 1:00-2:50 W. or Th.

Mr. FELLERS.

Prerequisite, Food Technology 51.

61. (I) INDUSTRIAL TECHNOLOGY.—A survey of commercial practices in the manufacture and preservation of food products. This will involve a study of equipment, factory arrangement, sanitation, government regulations, and the operation of types of commercial equipment in quantity production.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

10:00-10:50 Th.; 1:00-4:50 M. or Tu.

Mr. LEVINE.

Prerequisites, Food Technology 52; Bacteriology 31.

62. (I) INDUSTRIAL TECHNOLOGY.—This is a continuation of Course 61. The class exercises will deal largely with a survey study of the sources of raw material, commercial methods of manufacture, packing and distribution of the more common foods. The important contributions of research to food technology will be studied. Laboratory work will include the formation of research projects, interpretation of research data, the use of preservatives, the simple analysis of foods and the commercial practices as applied to preservation of such materials as are available: fish, meats, poultry, and spring vegetables. The inspection and grading of canned food will be studied. Sometime during the semester a two-day field trip to food plants in the Boston area will be taken. The trip will cost the student about fifteen dollars.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

10:00-10:50 Th.; 1:00-4:50 M. or Tu.

Mr. LEVINE.

Prerequisite, Food Technology 61.

71. (I) 72. (II) FOOD SCIENCE LITERATURE.—For seniors who specialize in food technology.

2 class hours.

Credit, 2.

11:00-11:50 M. W.

THE DEPARTMENT.

75. (I) and (II) FOOD PRESERVATION.—For students not majoring in food technology. A survey is made of the causes of food spoilage and of the methods commonly used in preserving foods. The important food products are discussed with emphasis on raw materials used, processing methods and examination of packaged foods. Methods of detecting and preventing spoilage are studied. The laboratory exercises

cover the preservation of the major food groups. The theory and use of the pressure cooker are included.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

12:00-12:50 Tu. Th.; 3:00-4:50 M. or Th.

Mr. ———.

82. (II) CONFECTIONS AND CEREAL PRODUCTS.—The materials offered in this course are as follows: the home manufacture of fruit preserves, candied and glacéed fruits, pastes, confections, candies, and other specialties. Approximately one-half the semester is devoted to elementary work in candy making. This course will also consider the principles of baking, doughs, various cereal products and dry mixes.

2 2-hour laboratory periods.

Credit, 2.

1:00-2:50 M. F. or 3:00-4:50 M. F.

Mr. LEVINE.

85. (I) 86. (II) MARINE PRODUCTS TECHNOLOGY.—A survey of marine products of commerce and industry. Canning, curing, and freezing of seafoods. Chemical and microbiological aspects of the industry. By-products, industrial problems and scientific literature. Emphasis is placed on the New England fisheries.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

Mr. FELLERS

91. (I) ANALYSIS OF FOOD PRODUCTS.—Laboratory studies on the grading of foods, examination of foods for adulteration, testing accessory products for quality, and determining the causes of spoilage or deterioration in processed food products. Physical, chemical, microbiological, and microscopical methods will be employed. Enrollment limited to 18.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

9:00-9:50 Th.; 1:00-4:50 Th. or F.

Mr. FELLERS, Mr. LIVINGSTON.

Prerequisites, Food Technology 52; Bacteriology 31; Chemistry 30.

92. (II) EXAMINATION OF FOOD PRODUCTS.—For students specializing in food technology. This is a continuation of Course 91. It includes interpretation of analysis, sanitation and food laws, government grading of processed foods, use of manuals and the technical work of trade associations. Laboratory work includes use of all kinds of laboratory and field equipment and apparatus used in food plants. A separate laboratory section is given for Bacteriology and Public Health majors.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

9:00-9:50 Th.; 1:00-4:50 Th. or F.

Mr. FELLERS, Mr. LIVINGSTON.

Prerequisite, Food Technology 91.

95. (I) and (II) **INTRODUCTORY RESEARCH METHODS.**—For food technology majors. The application of the fundamental sciences to food technology research.

Hours by arrangement.

Credit, 2.
THE DEPARTMENT.

FORESTRY AND WILDLIFE MANAGEMENT

Professor HOLDSWORTH, Professor TRIPPENSEE, Professor RHODES, Associate Professor RICH, Assistant Professor MACCONNELL, Mr. COLE*, Mr. GANLEY, Mr. ABBOTT.

26. (II) **DENDROLOGY.**—The taxonomic features, silvical characteristics and geographical distribution of the principal forest trees of temperate North America, and the description of the forests in which they occur; identification of the native and naturalized woody plants occurring in the forests of the Northeastern United States, in summer and winter condition, by means of keys and first-hand examination.

2 class hours; 2 2-hour laboratory and field periods.

Credit, 3.
Mr. RHODES, Mr. GANLEY.

51. (I) **FOREST MANAGEMENT OF WATERSHEDS.**—For students majoring in bacteriology and public health. Admission on recommendation of student's major adviser. A study of forest site—water factor relationships; the improvement of watershed forests through applied silviculture; relative suitability of tree species for watershed uses; forest protection measures.

3 class hours; special field trips.

Credit, 3.
Mr. HOLDSWORTH, Mr. RHODES.

52. (II) **AERIAL PHOTOGRAMMETRY.**—A course designed to familiarize the student with the use of aerial photographs in present-day forest management practice. Map making, forest inventory and other phases of forest management involving the application of photogrammetry are considered in detail. Field trips for checking photographic detail on the ground will be made. Texts and equipment costing about \$10.00 are required.

2 class hours; 1 4-hour laboratory period.

Credit, 3.
Mr. MACCONNELL, Mr. GANLEY.

53. (I) **SILVICS.**—Forest ecology as a foundation for silvicultural practice: the physiological basis of forest ecology; environmental factors, their effect upon vegetation, and how they are influenced by it; the development and silvical habits of the individual tree; the development, characteristics and

* On leave of absence for military service.

classification of forest communities; plant indicators; methods for the study and analysis of vegetation and its environment. 2 class hours; 1 4-hour laboratory and field period.

Credit, 3.
Mr. RHODES.

54. (II) FOREST SOILS.—The structure, development and maintenance of forest soils; their relationship to applied silviculture and forest productivity; the literature of forest soils with special reference to American experience.

3 class hours.

Credit, 3.
Mr. RHODES.

55. (I) and (Summer) THE ELEMENTS OF FOREST MENSURATION.—Methods of determining the volume and value of the forest growing stock; type mapping as it pertains to timber cruising; methods of predicting growth of trees and stands; the field work includes mapping and timber estimating on a forest realistic in size and condition and the submission of an inventory report.

2 class hours; 1 4-hour laboratory and field period.

Credit, 3.
Summer course: 3 44-hour weeks.

Mr. MACCONNELL, Mr. GANLEY.

56. (II) THE PRINCIPLES OF SILVICULTURE.—The methods of establishing and developing forest stands through the application of correct silvicultural practice. Intermediate cuttings and reproduction systems. Field work in applied silviculture, including the marking of forest stands for silvicultural treatment, is given on University forest property.

2 class hours; 1 4-hour laboratory period.

Credit, 3.
Mr. RHODES, Mr. HOLDSWORTH, Mr. GANLEY.

57. (I) FOREST ECONOMICS AND POLICY.—This course considers the forest as a resource yielding direct forest values and social benefits. The history of American forestry and the development of a forest policy together with the role of the forest in American economy are considered.

3 class hours.

Credit, 3.
Mr. HOLDSWORTH.

59. (I) FOREST PROTECTION.—The principle of protecting forests from all harmful agencies but with special reference to the prevention and control of forest fires, insects, and disease. Other agencies are treated in accordance with their importance.

3 class hours.

Credit, 3.
Mr. ABBOTT.

66. (II) WOOD ANATOMY AND IDENTIFICATION.—A basic anatomical study of wood elements, their various structural characteristics and functions. Relation of structure and properties to use. Microscopic study of wood elements. Practice in identification.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. RICH.

75. (I) MANUFACTURE AND DISTRIBUTION OF FOREST PRODUCTS.—A study of the techniques of manufacturing direct forest products, including production and cost studies; also the seasoning, grading and special processing prerequisite to marketing.

3 class hours.

Credit, 3.
Mr. RICH.

76. (II) WOOD TECHNOLOGY.—The structure, composition and properties of wood in relation to its economic utilization; wood-liquid relationships as they affect seasoning, preservation, and technological process for industrial purposes. A survey of the technological advances in the use of wood.

3 class hours.

Credit, 3.
Mr. RICH.

78. (Summer) HARVESTING OF FOREST PRODUCTS.—Primarily a field course designed to give students practice in the actual harvesting and preparation of direct forest products from the felling of standing timber through the log-making, skidding, transportation and sawing processes to the stacking of lumber. This part of the course is given on University owned forest land and at the mill of a private cooperator. Short field trips are made to active forest properties where harvesting is proceeding and a longer trip is made to New Hampshire and Maine to visit pulpwood and timber operations and manufacturing plants. Lectures and classwork survey the theory and practice of forest harvesting in the several U. S. forest regions.

3 44-hour weeks.

Credit, 3.
Mr. GANLEY, Mr. ———.

80. (II) PRINCIPLES OF FOREST MANAGEMENT. — The organization of the forest for sustained yield management with a study of the underlying principles. Forest regulation. The preparation of forest management plans.

2 class hours; 1 4-hour field and laboratory period.

Credit, 3.
Mr. MACCONNELL.

81. (I) REGIONAL SILVICULTURE.—The practice of silviculture as applied in the several forest regions of the United States with special reference to the treatment of the tree species of commercial importance. Emphasis is given to the

factors, both natural and economic, which govern silviculture in these regions.

3 class hours.

Credit, 3.
Mr. RHODES.

82. (II) SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY.—A study of forest tree seeds and their characteristics, production, harvest, storage, and qualities of germination. The production, distribution, and forest use of planting stock.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. ABBOTT.

85. (I) AIR SEASONING AND KILN DRYING.—A study of the proper conditioning of wood products by air seasoning and kiln drying. Laboratory work includes studies of moisture relations in the wood and a study of kiln operation.

3 class hours.

Credit, 3.
Mr. RICH.

Wildlife Management

27. (I) CONSERVATION OF NATURAL RESOURCES.—Natural resources of the United States including soil, water, forests, wildlife, and the important minerals, the historic background of their use and their present status in relation to the social and economic welfare. Includes the discussion of various conservation problems in relation to national prosperity.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. TRIPPENSEE.

70. (II) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of common game birds and mammals. Includes a study of natural habitats and methods of management.

1 class hour; 2 2-hour laboratory periods.

3:00-4:50 W. F.; lecture by arrangement.

Credit, 3.
Mr. TRIPPENSEE.

71. (I) WILDLIFE MANAGEMENT (1954-55).—Life histories, ecology, and management of waterfowl. Includes a study of natural habitats and method of management. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Credit, 3.
Mr. TRIPPENSEE.

72. (II) FOREST-ANIMAL RELATIONSHIPS.—For students majoring in Forestry. Effects of animals on the forest; the effects of forest practices on wild animal production; economic aspects of forest-animal relationships.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.
Mr. TRIPPENSEE.

73. (I) WILDLIFE MANAGEMENT.—Life histories, ecology, and management of predaceous birds and injurious mammals. Particularly designed for those who seek employment with rodent control division of Fish and Wildlife Service.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mr. TRIPPENSEE.

74. (II) TECHNIQUES IN WILDLIFE MANAGEMENT (1954-55).—Admission by permission of instructor. Quantitative field studies of wild animals of forest and farm. Includes cover mapping, habitat studies, census, food habits, and damage of game animals. For students interested in state and federal employment through civil service. Given in alternate years.

1 class hour; 1 4-hour laboratory period. Credit, 3.

1:00-1:50 W.; 1:00-4:50 M.

Mr. TRIPPENSEE.

75. (I) WILDLIFE MANAGEMENT (1955-56).—Life histories, ecology, and management of the furbearers. Includes a study of natural habitats, management and fur farm problems. Given in alternate years.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

11:00-11:50 Tu.; 3:00-4:50 Tu. Th.

Mr. TRIPPENSEE.

84. (II) SEMINAR (1953-54).—Study and discussion of problems in relation to agriculture, forestry, and the use and control of wildlife resources. For juniors and seniors majoring in wildlife management. Given in alternate years.

3 class hours. Credit, 3.

Mr. TRIPPENSEE.

GEOLOGY AND MINERALOGY

Professor WILSON, Assistant Professor NELSON, Assistant

Professor LIGHT, Mr. JOHANSSON, Mrs. ROTAN,

Mr. FARRINGTON, Mr. RICE, Mr. SHAUB.

27. (I) PHYSICAL GEOLOGY.—An introduction to the agents and processes that modify the earth's crust. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

28. (II) HISTORICAL GEOLOGY.—A survey of geological time, stressing the development of continents and the history of plants and animals. Field trips by arrangement.

2 class hours; 1 quiz hour; 1 2-hour laboratory period.

Credit, 3.

THE DEPARTMENT.

50. (I) ENGINEERING GEOLOGY.—A general course in engineering geology stressing earth structure, the dynamic processes, and agents of weathering. The laboratory work consists of mineral and rock-determination and map-reading as related to the phenomena of physical geology.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mr. LIGHT.

51. (I) MINERALOGY.—A descriptive study. Stress is placed upon the identification and occurrence of minerals.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. NELSON.

52. (II) LITHOLOGY.—A descriptive study of the classes of rocks with reference to manner of origin, modes of occurrence, structural features and the chemical and petrographic distinction within each group.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. NELSON.

54. (II) ECONOMIC GEOLOGY.—A course dealing with the origin, classification, and uses of metallic and non-metallic mineral deposits.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. LIGHT.

61. (I) GEOMORPHOLOGY (1954-55).—A review of recent studies concerning rock structures, weathering, streams, underground water, shorelines, wind work, volcanoes, and mountains. Field trips by arrangement. Given in alternate years.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. WILSON.

62. (II) PLEISTOCENE GEOLOGY (1954-55).—A study of Pleistocene world geology consisting of geological processes, land forms, existing and extinct glaciers, biota and stratigraphy. Field trips by arrangement. Given in alternate years.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Mr. WILSON.

63. (I) INVERTEBRATE PALEONTOLOGY.—A study of the history, development and identification of invertebrate animal fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. JOHANSSON.

64. (II) PLANT PALEONTOLOGY.—A study of the history, development, and identification of plant fossils. Field trips by arrangement.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. WILSON.

71. (I) 72. (II) SPECIAL PROBLEMS.—For seniors specializing in geology.

6 laboratory hours.

Credit, 3.

Hours by arrangement.

THE DEPARTMENT.

73. (I) STRUCTURAL GEOLOGY (1954-55).—A study of the origin of rock structures, their occurrence, and recognition. Field and laboratory problems emphasize the structure present in the Connecticut valley. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. LIGHT.

74. (II) PRINCIPLES OF STRATIGRAPHY (1953-54).—An examination of the principles of stratigraphic correlation and their application to the problems of the major rock units of the United States. Field and laboratory work consists primarily of problems related to the eastern United States. Given in alternate years.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. WILSON.

GERMAN

Professor ELLERT, Associate Professor GOLDSMITH, Assistant Professor SCHROEDER, Mr. STAWIECKI, Mr. LEA, Mr. KRATZ, Mr. TAUBE.

1. (I) 2. (II) ELEMENTARY GERMAN.—Grammar, prose composition, and reading. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Provost.

3 class hours.

Credit, 3.

THE DEPARTMENT.

5. (I) 6. (II) ADVANCED GERMAN PROSE.—Reading of representative German authors. Grammar review.

3 class hours.

Credit, 3.

8:00-8:50 Tu. Th. S.

Mr. LEA, Mr. GOLDSMITH.

Prerequisite, Entrance German.

25. (I) 26. (II) INTERMEDIATE GERMAN.—German prose and poetry; the simple German drama; grammar review. Passages of prose and poetry to commit to memory.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisites, German 1 and 2.

51. (I) NINETEENTH CENTURY (1954-55).—A study of the "Novelle" from the death of Goethe to 1890 (early realism to naturalism) with emphasis on literary and social forces in

the work of Tieck, Stifter, Keller, and Hauptmann. Given in alternate years.

3 class hours.

Credit, 3.

Mr. SCHROEDER.

Prerequisites, German 25 and 26.

52. (II) POETRY AND DRAMA OF THE NINETEENTH CENTURY (1954-55).—A study of the development of the drama and of lyric poetry from 1830 to 1890 with special emphasis on dramatic works of Grillparzer, Hebbel, and Hauptmann and the poetry of Mörike, Storm, and C. F. Meyer. Given in alternate years.

3 class hours.

Credit, 3.

Mr. GOLDSMITH.

Prerequisites, German 25 and 26.

53. (I) TWENTIETH CENTURY PROSE.—Main literary currents in contemporary German prose from Nietzsche to Hesse with particular attention to the work of Thomas Mann, Kafka, and Warfel.

3 class hours.

Credit, 3.

Mr. SCHROEDER.

54. (II) POETRY AND DRAMA OF THE TWENTIETH CENTURY.—Reading and discussion of significant lyrical works of Hofmannsthal, George, and Rilke, and representative dramas by Hauptmann and Georg Kaiser.

3 class hours.

Credit, 3.

Mr. GOLDSMITH.

Prerequisites, German 25 and 26.

55. (I) STORM AND STRESS (1953-54).—A study of storm and stress in German literature centering in the young Goethe. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ELLERT.

Prerequisites, German 25 and 26.

56. (II) ROMANTICISM (1954-54).—A study of the poetry and prose writings of the romantic period from Novalis to Heine. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ELLERT.

Prerequisites, German 25 and 26.

57. (I) GOETHE'S FAUST.

3 class hours.

Credit, 3.

Mr. GOLDSMITH.

Prerequisites, German 25 and 26.

58. (II) MIDDLE HIGH GERMAN.—Readings of Middle High German texts in the original with an introduction to the grammar.

3 class hours.

Credit, 3.

Mr. KRATZ.

Prerequisites, German 25 and 26.

59. (I) THE GERMANIC LANGUAGES.—An introduction to general and Germanic linguistics for German and English majors; a survey of the relationship between German, English, and the other Indo-European tongues and of the historical development of German and English as the two principal Germanic literary languages.

3 class hours.

Credit, 3.

Mr. KRATZ.

60. (II) THE CLASSICAL PERIOD (1953-54).—A study of representative works by Lessing, Goethe, and Schiller. Given in alternate years.

Mr. SCHROEDER.

Prerequisites, German 25 and 26.

68. (II) GERMAN LITERATURE OF THE MIDDLE AGES (1953-54).—A survey of the literature of the German language from the earliest literary documents to the 15th century, with readings in modern German translation of the Nibelungenlied, Gudrun, Parzival, Tristan, Der arme Heinrich, and the lyrics of Walter von der Vogelweide. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ELLERT.

79. (I) 80. (II) CONVERSATIONAL GERMAN AND ADVANCED GERMAN COMPOSITION.—Admission by arrangement with the instructor. Practice in the oral and written language.

4 class hours.

Credit, 3.

3:00-4:50 Tu. Th.

Mr. SCHROEDER.

Prerequisites, German 25 and 26.

81. (I) 82. (II) SCIENTIFIC GERMAN.—Admission by arrangement with the instructor. Intensive and extensive readings of scientific texts in various fields taken from standard German works.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. TAUBE.

Prerequisites, German 25 and 26.

GOVERNMENT

Professor CAHILL, Assistant Professor GOODWIN,
Mr. ALLEN, Mr. TINDER, Mr. MAINZER.

25. (I) and (II) AMERICAN GOVERNMENT.—A study of the principles, machinery, dynamics and problems of American national government.

3 class hours.

Credit, 3.

THE DEPARTMENT.

28. (II) STATE AND LOCAL GOVERNMENT.—A survey of the governmental structure and functions of the American state and its local governments, with emphasis on state-local relationships.

3 class hours.

Credit, 3.

THE DEPARTMENT.

52. (II) EUROPEAN GOVERNMENT.—A comparative study of the politics and institutions of Great Britain, France, Russia, and other European governments.

3 class hours.

Credit, 3.

Mr. ALLEN.

61. (I) PUBLIC ADMINISTRATION.—A general survey of the field of public administration. Special emphasis will be placed on the principles of organization, the functions performed by administration, and the relation of administration to democracy.

3 class hours.

Credit, 3.

Mr. MAINZER.

62. (II) ADMINISTRATIVE LAW.—A study of government regulatory activities in relation to industry, agriculture, and labor, with emphasis on the legal framework within which these activities operate.

3 class hours.

Credit, 3.

Mr. MAINZER.

63. (I) POLITICAL PARTIES AND ELECTIONS.—A study of the American political process, with emphasis on parties, pressure groups, and public opinion.

3 class hours.

Credit, 3.

Mr. GOODWIN.

64. (II) MUNICIPAL GOVERNMENT.—A survey of the governmental structure and function of American municipalities. Special attention is given to such functions as protection, education, welfare, correction, city planning and zoning.

3 class hours.

Credit, 3.

Mr. GOODWIN.

65. (I) CONSTITUTIONAL LAW.—An historical study of American Constitution as interpreted by decisions of the Supreme Court.

3 class hours.

Credit, 3.

Mr. CAHILL.

66. (II) AMERICAN POLITICAL THOUGHT.—A study of the development of American political thought from colonial times to the present.

3 class hours.

Credit, 3.

Mr. CAHILL.

67. (I) INTERNATIONAL ORGANIZATION.—A study of international organization in the twentieth century, with emphasis upon the United Nations and regional organizations.

3 class hours.

Credit, 3.

Mr. ALLEN.

68. (II) INTERNATIONAL LAW.—A study of the origin, character, and function of international law.

3 class hours.

Credit, 3.

Mr. ALLEN.

71. (I) ANCIENT AND MEDIEVAL POLITICAL THOUGHT.—A study of the development of political thought and its relation to cultural and institutional growth from the time of the Greeks to the end of the Middle Ages.

3 class hours.

Credit, 3.

Mr. TINDER.

72. (II) MODERN POLITICAL THOUGHT.—A study of the development of political thought and its relation to cultural and institutional growth from the rise of the modern state to the present.

3 class hours.

Credit, 3.

Mr. TINDER.

93. (I) 94. (II) SEMINAR.—A study of special problems in the field of government. For seniors only.

3 class hours.

Credit, 3.

THE DEPARTMENT.

HISTORY

Professor CALDWELL, Professor CARY, Assistant Professor

DAVIS, Assistant Professor ZEENDER, Assistant

Professor PFLANZE, Mr. POTASH, Mr. GAGNON,

Mr. KINGDON, Mr. SOLT, Mr. SACHAR.

5. (I) 6. (II) MODERN EUROPEAN CIVILIZATION.—The first semester covers the period from the later Middle Ages to 1815; the second semester, the period from 1815 to the present. These courses are required of candidates for the B.A. degree but may be elected independently by other students.

3 class hours.

Credit, 3.

THE DEPARTMENT.

31. (I) 32. (II) ENGLISH HISTORY.—Emphasis on economic, social, and cultural influences, as well as on constitutional development. Either semester may be elected independently.

3 class hours.

Credit, 3.

Mr. CALDWELL, Mr. KINGDON, Mr. SOLT.

51. (I) ANCIENT HISTORY.—A general survey of Mesopotamian, Egyptian, Greek, and Roman history, with primary emphasis on cultural and intellectual achievements.

3 class hours.

Credit, 3.

Mr. DAVIS.

53. (I) INTERNATIONAL RELATIONS.—The nation-state system and conceptions of national interest in modern world politics. The forms and distribution of power by which states seek to implement national interests. The making of foreign policy and methods of adjusting international conflict. Attention will be given to current international problems.

3 class hours.

Credit, 3.

Mr. PFLANZE.

54. (II) THE FAR EAST (1954-55).—A general historical introduction to the civilization and contemporary problems of China and Japan. The first half covers the traditional civilization of China and Japan and the early impact of the west to 1890. The second half deals with revolutionary developments of the twentieth century and the place of the Far East in the world balance of power.

3 class hours.

Credit, 3.

Mr. GAGNON.

56. (II) HISTORY OF RUSSIA (1953-54).—A general historical introduction to the civilization and contemporary problems of Russia. Growth of the Russian state, society, culture and ideology, and their relations to the non-Russian world. Emphasis on the Soviet period.

3 class hours.

Credit, 3.

Mr. GAGNON.

57. (I) 58. (II) HISPANIC-AMERICAN HISTORY.—The first semester deals with the colonial period: the age of the "conquistadores", political, economic, and cultural developments, and growth of the independence movement; the second semester with the period of national development from 1810 to the present. Emphasis will be given to the history of Mexico and the more important South American countries. Either semester may be elected independently.

3 class hours.

Credit, 3.

Mr. POTASH.

59. (I) 60. (II) HISTORY OF THE UNITED STATES.—A survey of the national development including political, social, economic, and cultural factors in the growth of American democracy. The first semester covers the period to 1865; the second, from 1865 to the present. Either semester may be elected independently.

3 class hours.

Credit, 3.
Mr. CARY.

65. (I) NINETEENTH AND TWENTIETH CENTURY ENGLAND (1955-56).—A topical study of England since 1815. Emphasis is given to social change and to movements of thought. Subjects treated include: Victorian society and ideals; growth of democracy; imperial development; socialist Britain. Considerable biographical reading. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 32.

67. (I) TUDOR AND STUART ENGLAND (1954-55).—A brief survey of the Tudor Period followed by a detailed study of Early Stuart England. Emphasis is placed on social, religious, and intellectual aspects of English life in the period. Given in alternate years.

3 class hours.

Credit, 3.
Mr. CALDWELL.

Prerequisite, History 31 or 32.

69. (I) EUROPE, 1870-1918.—Internal developments of the principal countries, including political and economic changes, social unrest, and intellectual currents; the development of imperialism; a detailed study of conditions and diplomacy which led to the World War; military history of the War.

3 class hours.

Credit, 3.
Mr. ZEENDER.

Prerequisite, History 6.

70. (II) EUROPE SINCE 1918.—Approximately half of the course is devoted to international affairs, including the Peace Settlement, the development of German, Italian, and Japanese aggression, and World War II. The other half of the course is a study of internal developments in the principal European nations.

3 class hours.

Credit, 3.
Mr. CALDWELL.

72. (II) HISTORY OF AMERICAN WESTWARD EXPANSION, 1763-1893.—Advance of settlement from the Appalachians to

the Pacific and influence of the frontier upon social, economic, and political conditions in the country as a whole.

3 class hours.

Credit, 3.

Mr. DAVIS.

Prerequisite, History 59.

75. (I) MEDIEVAL HISTORY.—Europe from the collapse of Roman civilization to the Renaissance. Fusion of the Graeco-Roman inheritance, Christianity, and Germanic traditions in the building of Western European civilization. The medieval outlooks as expressed in the thought and culture of the High Middle Ages.

3 class hours.

Credit, 3.

Mr. ZEENDER.

76. (II) HISTORY OF THE RENAISSANCE.—The later Middle Ages; the Church at the height of power; the rise of nationalities; the Italian towns; the New Learning and its relation to art, science, invention, geographical discoveries; spread and effects of the Renaissance.

3 class hours.

Credit, 3.

Mr. ZEENDER.

77. (I) 78. (II) THE HISTORY OF SCIENCE IN WESTERN CIVILIZATION.—This course will trace the growth of the community of science as it exists in the world today. Emphasis will be placed upon the mutual relations between science and the economic, social, and intellectual forces in society at large. Not offered in 1953-54.

2 class hours.

Credit, 2.

Mr. ———.

81. (I) DIPLOMATIC HISTORY OF THE UNITED STATES. 1776-1900.—Basic problems in American foreign policy to the end of the nineteenth century.

3 class hours.

Credit, 3.

Mr. CARY.

82. (II) DIPLOMATIC HISTORY OF THE UNITED STATES SINCE 1900.—The history of the United States as a world power.

3 class hours.

Credit, 3.

Mr. CARY.

Prerequisites, History 59 and 60 or permission of instructor.

91. (I) HISTORICAL BIBLIOGRAPHY.—Training in assembling a bibliography and an introduction to the works of some leading historians.

1 class hour.

Credit, 1.

THE DEPARTMENT.

92. (II) SEMINAR.—Instruction in the evaluation of source materials and the preparation of reports.
1 class hour. Credit, 1.

THE DEPARTMENT.

HOME ECONOMICS

Professor MITCHELL, Associate Professor BRIGGS, Assistant Professor MERRIAM, Assistant Professor COOK, Assistant Professor PIATT, Assistant Professor STECH, Assistant Professor DAVIS, Mrs. THIES, Mrs. WILHELM, Miss DAVEY, Miss HAWES, Miss FORBES.

1. (I) INTRODUCTION TO HOME ECONOMICS.—The course introduces the student to the objectives in Home Economics and the fields of specialization for which it prepares. Consideration is given to a philosophy of living which emphasizes the responsibility of a woman to her family, to her community wherever she is, and to the world. Introductory work is offered in food and nutrition, child development and family life. Laboratory work includes food selection and simple preparation, and observation in the Nursery School.

3 class hours.

Credit, 3.

THE DEPARTMENT.

2. (II) CLOTHING SELECTION.—A study of the principles of clothing selection in order to assist each student to choose satisfactorily line, color, and texture; a study of the principles of buymanship in relation to ladies' ready-to-wear; fundamentals of construction for cotton and linen.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mrs. WILHELM, Miss HAWES.

26. (II) TEXTILES.—This course is designed to give the student an introduction to the characteristic properties and uses of natural and synthetic fibers; the conversion of fiber to finished fabrics; fabric identifications; buying and use of fabrics for clothing and home use.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

MISS HAWES.

30. (II) FOOD SCIENCE AND PREPARATION.—A study of the fundamental scientific principles and comparative methods of food preparation. The nutritional and economic aspects of foods are also stressed.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

MISS DAVIS, MISS FORBES.

31. (I) APPLIED ART.—Art principles are studied with many practical applications for selecting and arranging. Specific problems in decorating cloth, wood, and leather afford opportunity for individual expression.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

MISS BRIGGS.

35. (I) CLOTHING CONSTRUCTION.—Advanced construction and fitting problems with emphasis on new fabrics. In the latter part of the semester provision is made for individual development in the field of clothing in which the student is most interested. Sections offered are: more advanced construction and fitting problems; visual aids for teaching clothing; creative pattern drafting and merchandising women's ready-to-wear.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

Mrs. WILHELM, Miss HAWES.

Prerequisite, Home Economics 2 or equivalent.

51. (I) FOOD SELECTION AND MEAL PLANNING.—Meal planning, serving and etiquette and emphasis on well-balanced meals as to nutritive value and economy of money, time, and labor in preparation. Further study of food principles and techniques of cookery and a unit in food preservation, freezing and canning is included.

2 class hours; 1 4-hour laboratory period. Credit, 3.

Miss DAVIS, Miss DAVEY.

Prerequisite, Home Economics 30; Chemistry 33.

52. (II) NUTRITION AND DIETETICS.—A study of the fundamentals of normal nutrition including energy needs, the metabolism of proteins, carbohydrates, fats, vitamins, and minerals; and the quantitative requirements for these various essential nutrients. Laboratory work provides for further study of the composition of foods and their contribution to the diet and the relationship of the nutritive value to cost. Nutritive loss due to cooking, storage, etc. is given consideration.

3 class hours; 1 2-hour laboratory period. Credit, 3.

Mrs. COOK.

Prerequisites, Home Economics 30; Chemistry 33 and Zoology 1 or 35.

54. (II) NUTRITION.—For students who are not majoring in Home Economics and who do not have prerequisites for Home Economics 52. This course is designed to interpret the technical knowledge of foods and nutrition in terms of its practical application for optimum health.

2 class hours.

Credit, 2.

Mrs. COOK.

56. (II) FOOD PREPARATION AND MEAL PLANNING.—This course is designed to meet the needs of those who wish a general knowledge of the basic food principles. It includes latest methods and techniques of cookery, conservation of nutrients, menu planning and food preparation, buying of food, consumer education and table service, decoration and etiquette. It is recommended for students who want a scientific

as well as practical knowledge of food and its preparation for everyday use.

2 class hours; 1 3-hour laboratory period.

Credit, 3.
Miss DAVEY.

57. (I) CLOTHING SELECTION AND SIMPLE CONSTRUCTION.—For students not majoring in home economics. This course is designed to stimulate an interest in good workmanship. Emphasis is given to construction technique such as fitting, pattern use and altering.

1 class hour; 1 3-hour laboratory period.

Credit, 2.
Miss HAWES.

60. (II) HOUSEHOLD EQUIPMENT AND DEMONSTRATION TECHNIQUES.—Selection, care and operation of household equipment and the study of the mechanical principles involved. Student demonstrations given for practice with all types of equipment. Study of home lighting and wiring. Outside demonstrations and field trips are planned.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Miss MERRIAM.

62. (II) HOME FURNISHING.—A study of the fundamental principles which underlie the successful planning and furnishing of a satisfying home. A study of period homes and furnishings is included. Many applications of these principles are worked out in practical problems.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Miss BRIGGS.

70. (II) CHILD DEVELOPMENT.—The growth and development of the child, his basic needs, aspects of behavior—routine, creative and social—as they are related to personality development. Planned observation and participation in nursery school.

3 class hours; 1 1-hour laboratory period.

Credit, 3.
Mrs. THIES.

71. (I) RETAIL FOOD BUYING.—This course is offered jointly by the departments of olericulture, animal husbandry, and poultry husbandry for all students interested in retail marketing. First 5 weeks: vegetables and fruits, retail buying, varieties and adaptability to various uses, season of availability, grades, packs and packages. Second 5 weeks: poultry and eggs—dressed poultry is graded and prepared in various ways for the table and home freezing. Demonstrations are given of handling and market classification of eggs. Third 5 weeks: meats—demonstration and laboratory practices in identification and classification of meat cuts, in preservation (freezing and curing) and in judging quality.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. SNYDER, Mr. VONDELL, Mr. HALE.
Miss STECH, coordinator.

75. (I) **ECONOMICS OF THE HOUSEHOLD.**—A study of personal and family standards of living in the modern home, the economic relations of the household, and the use of time, energy, and money as a means to influence the home situation. 3 class hours.

Credit, 3.
Miss MERRIAM.

77. (I) and (II) **HOME MANAGEMENT PRACTICE.**—Successive groups of seniors live in the home management house or apartment and assume responsibilities involved in managing a home. Meals are planned on low, medium, and high income levels.

Credit, 3.
Miss MERRIAM, Miss DAVEY.

Prerequisites, Home Economics 51, 52, and 75, or by special permission.

78. (II) **ADVANCED TEXTILE DESIGN.**—Weaving and handling of complicated looms. Other types of textile design such as stencilling, silk screen printing, batik, block print, with individual problems dependent on the student's special interests.

1 class hour; 2 3-hour laboratory periods. Credit, 3.
Miss BRIGGS.

Prerequisite, Home Economics 26.

79. (I) **TEXTILE TESTING (1955-56).**—Testing and analysis of textile fibers and fabrics, emphasis placed on testing techniques for composition, thread count, tensile strength, color fastness and finishes. The subject matter is of value to students interested in scientific or commercial textile testing. 2 class hours; 1 3-hour laboratory period.

Credit, 3.
Miss HAWES.

Prerequisite, Home Economics 26.

80. (II) **FAMILY LIFE.**—A study of the modern family; ideals and responsibilities of the home and the individual's share in developing positive family relationships.

3 class hours. Credit, 3.
Mrs. PIATT.

81. (I) **METHODS OF TEACHING HOME ECONOMICS.**—A study of the philosophy of general education; the application of home economics to the entire school program; development of curricula based upon student needs; exploration of instructional methods and techniques. This course gives credit toward meeting state standards for teachers.

3 class hours. Credit, 3.
Mrs. PIATT.

85. (I) **THEORY AND PRACTICE OF NURSERY SCHOOL MANAGEMENT.**—This course is planned to give students a

background in the history and philosophy of the pre-school program; theory and techniques of nursery school practice; children's activities in music, art, literature, and science; fundamentals of play and use of play materials, and methods of observation and recording. Supervised participation in child development laboratory as well as field trips to observe special groups.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mrs. THIES.

Prerequisite, Home Economics 70.

87. (I) PRINCIPLES AND PRACTICES OF TAILORING.—Emphasis on handling of wool in the making of suits and coats.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM.

Prerequisite, Home Economics 35 or equivalent.

88. (II) APPLIED DRESS DESIGN.—Costume design through draping and pattern making. An intensive study is made of texture, line, color and fit as applied to dress design and the figure.

3 2-hour laboratory periods.

Credit, 3.

Mrs. WILHELM.

Prerequisite, Home Economics 35 or equivalent.

89. (I) DIET THERAPY.—The application of nutrition principles to diet in disease. Recent theories of dietary treatment of gastro-intestinal disorders, obesity, anemia, fevers, diabetes, food allergy, cardiovascular and biliary tract diseases are reviewed critically. Students are required to use and be familiar with current medical literature as it applies to nutritional problems in disease and at the same time be open-minded regarding new developments in this field. Scientific and medical terminology is emphasized.

3 class hours.

Credit, 3.

Mrs. Cook.

Prerequisites, Home Economics 52; Chemistry 79; Zoology 35.

90. (II) PROFESSIONAL SEMINARS.—A one-credit seminar is offered in each of the five fields of subject matter: Nutrition, Textiles, Foods, Home Management and Equipment, Family Life and Child Development. One seminar is required of each senior and permission may be granted to take as many as three of the five.

Credit, 1-3.

HOME ECONOMICS STAFF.

91. (I) 92. (II) QUANTITY FOOD PREPARATION AND INSTITUTIONAL MANAGEMENT.—For qualified juniors or seniors interested in institutional food service. A study of the principles of organization, personnel management, the administration, food costs, operating expenses, and the special

functions of the dietitian. Laboratory work is at one of the university dining halls and field trips are planned. It is expected that students will enroll for the work of both semesters. Students wishing to qualify for administrative institutional work are advised to take Accounting 25 and Home Economics 71.

2 class hours, 1 4-hour laboratory period or field work.

Credit, 3.

Miss STECH.

Prerequisites, Home Economics 51 and 52.

93. (I) EXPERIMENTAL FOODS.—The testing and comparing of different food materials and methods of preparation, including advanced work in the science and techniques of cookery. Special individual problems will be studied. The course is helpful to those interested in commercial food testing and valuable to those wishing to develop a scientific approach to the study of foods.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Miss DAVIS.

Prerequisite, Home Economics 30.

95. (I) CHILD NUTRITION.—A study is made of nutritional needs from prenatal life through infancy and childhood. Methods of judging nutrition, also causes and effects of malnutrition are discussed. Menus for children and measures to insure the consumption of optimal diets are put in practice with laboratory work in the Nursery School.

3 class hours. Laboratory by arrangement.

Credit, 3.

Mrs. COOK.

Prerequisite, Home Economics 52 or 54.

98. (I) and (II) PROBLEMS IN HOME ECONOMICS.—An intensive study of some phase of home economics. By permission of the Staff adviser.

Credit, 3.

HOME ECONOMICS STAFF.

HYGIENE

HYGIENE.—All freshmen are required to attend a series of lectures on personal hygiene. For men students these lectures are included in the Military program; for women students they are scheduled as a separate course.

Credit, 1.

THE HEALTH SERVICE STAFF.

JOURNALISM

Professor MUSGRAVE.

84. (II) COMMUNITY JOURNALISM.—A study of the weekly newspaper, the small-city daily, and the scholastic press, combined with training in copyediting. The University

and town weeklies are used as laboratories. Given in 1953 and alternate years.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

85. (I) INTRODUCTION TO JOURNALISM.—A basic course in reporting designed to acquaint the student with the scope, principles, and practice of contemporary journalism. Stress is placed upon the role of the press as a social institution and upon the relationships between a general education and effective journalism.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

86. (II) FEATURE ARTICLE WRITING.—Instruction in writing feature or magazine articles, combined with a study of the field of magazine journalism. The practice work is related to problems of interpretative writing, communication, and public opinion. Each student is expected to publish a feature article in a newspaper, a trade journal or other magazines.

3 class hours.

Credit, 3.
Mr. MUSGRAVE.

88. (II) NEWSPAPER INTERNSHIP.—Advanced reporting and copyediting, with laboratory work on daily newspapers in the area. Limited to seniors who intend to go into newspaper or public relations or radio news or editing work. Admission only by permission of instructor.

2 class hours; 1 laboratory period.

Credit, 3.
Mr. MUSGRAVE.

Prerequisites, Journalism 85, and 84 or 86.

LANDSCAPE ARCHITECTURE

Professor OTTO, Professor BLUNDELL, Assistant Professor McLINDON, Assistant Professor PROCOPIO, Mr. MACIVER, Mr. HAMILTON.

Landscape Architecture

25. (I) FREEHAND DRAWING AND ELEMENTARY DESIGN.—The work in this course is to supply the student with technical aspects of freehand drawing and design necessary to proficiency in that field.

3 2-hour laboratory periods.
1:00-2:50 M. W. F.

Credit, 3.
Mr. MACIVER.

26. (II) LANDSCAPE DRAFTING.—This course continues the work in Landscape Architecture 25, but draws on the mechanical aspects of the designers problems and includes

simple projections—orthographic, perspective, and isometric—and architectural shades and shadows.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. MACIVER.

51. (I) ELEMENTS OF TOPOGRAPHY AND CONSTRUCTION.—Contour interpolation, grading and drainage, plans, drive design, profiles and sections, computation of earth work. Application of surveying to landscape construction.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. PROCOPIO.

Prerequisites, Civil Engineering 27; Landscape Architecture 26.

52. (II) CONSTRUCTION DETAILS.—A series of problems in architectural garden features as walks, steps, walls, gates, pools, and small structures.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. PROCOPIO.

Prerequisites, Landscape Architecture 51.

53. (I) INTRODUCTORY DESIGN.—Fundamental principles of composition with application to problems in the design of gardens and small home grounds.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. OTTO.

Prerequisites, Landscape Architecture 25 and 26 or permission of the instructor.

54. (II) GENERAL DESIGN.—A series of problems in the design of private properties and public works. Members of this class will be required to take a two-day field trip to visit typical examples of design; approximate cost, \$15.00.

3 2-hour laboratory periods.

Credit, 3.

1:00-2:50 M. W. F.

Mr. OTTO.

Prerequisites, Landscape Architecture 51, 53, and concurrently 52.

79. (I) CONSTRUCTION AND MAINTENANCE (1955-56).—A study of construction methods and materials as applied to the landscape field. Given in alternate years.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. PROCOPIO.

80. (II) HISTORY AND LITERATURE OF LANDSCAPE ARCHITECTURE.—A review of the history and literature of landscape architecture and allied fields. Compilation of bibliographies of significant works.

2 class hours.

Credit, 2.

8:00-8:50 Tu. Th.

Mr. OTTO.

81. (I) 82. (II) **ADVANCED DESIGN.**—Class B Exchange Problems plus specialized study of landscape details and a summary of general design. Members of the class may be required to take a two-day field trip to visit typical examples of design; approximate cost, \$15.00.

3 2-hour laboratory periods.

Credit, 3.

3:00-4:50 M. W. F.

Mr. HAMILTON.

Prerequisites, Landscape Architecture 53 and 54.

83. (I) **ARCHITECTURE (1954-55).**—The history of architectural development, including styles of architecture and construction principles of value to landscape architects when working with architectural problems. Given in alternate years.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. McLINDON.

84. (II) **SKETCHING.**—Drawing and sketching in various mediums from outdoor and indoor subjects.

2 2-hour laboratory periods.

Credit, 2.

Mr. MACIVER.

86. (II) **CITY PLANNING.**—A critical examination of those factors which influence and guide the physical growth and arrangement of communities in harmony with their social and economic needs.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. McLINDON.

87. (I) **CITY PLANNING.**—An application of the principles of modern civic art through a series of problems on the design of various types of urban land areas.

3 2-hour laboratory periods.

Credit, 3.

Mr. McLINDON.

Prerequisite, Landscape Architecture 86.

Horticulture

1. (I) **PLANT PROPAGATION.**—This course serves as an introduction to the field of horticulture, emphasizing the methods and principles involved in the propagation of horticultural plants.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. THAYER, Mr. PROCOPIO.

26. (II) **PLANT MATERIALS.**—Detailed study of deciduous and evergreen trees, with special reference to their mature form and character, means of identification, natural associations, and uses of the various types of trees in landscape work.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. BLUNDELL.

51. (I) PLANT MATERIALS.—Detailed study of shrubs and woody vines, and their identification, with especial emphasis being given to their adaptability to the various landscape uses, methods of handling, and care.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. BLUNDELL.

52. (II) PLANTING DESIGN.—A study of the utilization of plant materials in combination as applied to the many conditions and demands of landscape work.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Mr. BLUNDELL.

Prerequisites, Horticulture 26 and 51.

LATIN

Instructors in Romance Languages.

51. (I) 52. (II) ELEMENTARY LATIN.—An intensive course in Latin grammar and reading. Recommended for prospective language teachers and those planning graduate work in foreign languages or English who have had no previous Latin. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Dean.

3 class hours. Credit, 3.
Mr. GREENFIELD.

55. (I) 56. (II) ADVANCED LATIN.—A survey of classical Latin literature: dialogues and oratory (Cicero), the epic (Virgil), lyric poetry (Catullus and Horace), historical prose (Livy), satire, comedy, and other genres. Recommended for prospective language teachers and those planning graduate work in foreign languages or English who have had two or more years of high school Latin.

3 class hours. Credit, 3.
Mr. GREENFIELD.

Prerequisites, Latin 51 and 52 or 2 years of high school Latin.

MATHEMATICS

Professor ANDERSEN, Professor WAGNER, Associate Professor BOUTELLE, Assistant Professor SCHOONMAKER, Assistant Professor ROSE, Assistant Professor CULLEN, Mr. BUZZELL, Mr. SKILLINGS, Mr. ALLEN, Mr. MIENTKA,† Mr. MOSER, Mr. HALPERN,† Mr. KHEIRALLA, Mr. BUSSEL, Mr. PUNGA, Mr. WATSON, Mr. NAYLOR, Miss LAVALLEE, Mr. PINA, Mr. NEWLANDER, Mrs. RICE.

01. (I) ELEMENTARY COLLEGE ALGEBRA.—A course intended for those students who offer only one unit of algebra for entrance. It contains a review of elementary algebra and

† On leave of absence.

a more thorough study of such topics as quadratic equations, exponents and radicals, and progressions. No college credit is given for this course, but the successful completion of this course and Mathematics 14 which follows in the second semester, may satisfy the freshman mathematics requirement unless the student's major requires further mathematics.

3 class hours.

Credit, 0.

THE DEPARTMENT.

5. (I) INTRODUCTORY ENGINEERING MATHEMATICS.—Trigonometry and algebra: a rapid basic review, theory of equations, simple determinants and the slide rule. Plane analytic geometry: the straight line, conic sections, selected higher plane curves, polar coordinates and parametric equations.

4 class hours.

Credit, 4.

THE DEPARTMENT.

6. (II) INTRODUCTORY CALCULUS FOR ENGINEERING.—Differentiation, with applications, technique of integration.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 5.

7. (I) ALGEBRA AND TRIGONOMETRY.—For all freshmen, except majors in Engineering, who are required to take a full year of college mathematics. Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry.

3 class hours.

Credit, 3.

THE DEPARTMENT.

8. (II) ALGEBRA.—This course is designed for the freshmen who do not plan to proceed to Calculus. Theory of equations, progressions, mensuration, number systems, and the elements of statistics and mathematics of investments.

3 class hours.

Credit, 3.

THE DEPARTMENT.

10. (II) ALGEBRA AND ANALYTIC GEOMETRY.—This course is designed for the freshmen who plan to take Calculus. Theory of equations, binomial theorem, determinants of higher order, and plane analytic geometry.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 7.

12. (II) FUNCTIONAL MATHEMATICS.—For freshmen who are not required to take a full year of college mathematics. Fractions, percentage, linear and quadratic equations with applications, exponents, logarithms, slide rule, proportion,

graphs, statistics, progressions, and the elements of mathematics of investments.

3 class hours.

Credit, 3.

THE DEPARTMENT.

14. (II) TRIGONOMETRY AND ANALYTIC GEOMETRY.—A study of the essential elements of elementary trigonometry and selected topics in algebra.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 01.

29. (I) DIFFERENTIAL CALCULUS.—The basic ideas and methods of the differential calculus.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 10.

30. (II) INTEGRAL CALCULUS.—A continuation of Mathematics 29 into the field of the integral calculus, with special emphasis on application to problems.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 29.

31. (I) APPLIED CALCULUS FOR ENGINEERS.—Area, volume, length of curve, centroid, moment of inertia, liquid pressure, work, partial differentiation.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 6.

32. (II) APPLIED CALCULUS FOR ENGINEERS.—Multiple integrals, infinite series, expansion of functions, hyperbolic functions, differential equations.

4 class hours.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 31.

51. (I) MODERN SYNTHETIC GEOMETRY.—An extension of the geometry of the triangle and the circle. The course is intended especially for those planning to be high school teachers.

3 class hours.

Credit, 3.

Mr. ROSE.

Prerequisite, Mathematics 30.

53. (I) 54. (II) HIGHER ALGEBRA.—Permutations, combinations, probability; mathematical induction, matrices, determinants, linear equations and dependence; quadratic forms and elimination theory; the complex number system;

polynomial equations; elementary theory of groups, rings and fields.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 10.

55. (I) MATHEMATICS OF FINANCE.—The mathematical principles of simple and compound interest, annuities, depreciation, valuation of bonds, insurance. The development and application of aids to computation in problems arising from financial transactions.

3 class hours.

Credit, 3.

Mr. BOUTELLE.

Prerequisite, Mathematics 7.

56. (II) FINITE DIFFERENCES AND PROBABILITY (1954-55).—Given in alternate years.

3 class hours.

Credit, 3.

Mr. WAGNER.

Prerequisite, Mathematics 30.

60. (II) SPHERICAL TRIGONOMETRY AND SOLID ANALYTIC GEOMETRY (1953-54).—The trigonometry of the sphere with application to terrestrial and celestial problems. This is followed by a study of higher plane curves and the analytic representation of points, lines, and surfaces in space. Given in alternate years.

3 class hours.

Credit, 3.

Mr. BOUTELLE.

Prerequisite, Mathematics 30.

62. (II) STATISTICS.—The fundamental mathematical principles of statistical analysis. The derivation of the basic formulas used, and the study and discussion of such topics as averages, dispersion, skewness, curve fitting, least squares, linear and curvilinear correlation, probability and its application to statistics.

3 class hours.

Credit, 3.

Mr. WAGNER.

Prerequisite, Mathematics 30, previously or concurrently.

66. (II) INTRODUCTION TO HIGHER GEOMETRY (1953-54).—A study of various methods employed in the modern treatment of the geometry of points, lines, and conics. Such topics as homogeneous point and line coordinates; infinite elements; harmonic division; groups of transformations and their invariants; and the elements of projective and other geometrics, will be considered. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ANDERSEN.

Prerequisite, Mathematics 10.

71. (I) VECTOR ANALYSIS (1954-55).—The algebra and calculus of vectors. Applications to physics and other fields will be considered. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ANDERSEN.

Prerequisites, Mathematics 30; Physics 26.

72. (II) HISTORY OF MATHEMATICS (1954-55).—A study of mathematics as it has developed historically. Topics considered include classical problems and concepts of mathematics and the lives and times of the great mathematicians. This course is recommended especially for prospective high school teachers. Given in alternate years.

3 class hours.

Credit, 3.

Mr. ROSE.

Prerequisite, Mathematics 30.

74. (II) THEORY OF NUMBERS (1953-54).—Euclid's Algorithm, Theory of Prime Numbers, Aliquot parts, congruences, further topics in number theory. Given in alternate years.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

81. (I) DIFFERENTIAL GEOMETRY (1955-56).—Theory of the geometry of curves and surfaces in three dimensions. Given in alternate years.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

83. (I) COMPUTATIONAL METHODS (1954-55).—Errors and approximations in computation, methods of approximating roots of equations, approximation of functions, empirical curve, fitting, approximate integration, and numerical integration of ordinary differential equations. Given in alternate years.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

91. (I) (INTERMEDIATE) CALCULUS. — Series, expansion of functions, partial differentiation, envelopes, and multiple integrals.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

92. (II) DIFFERENTIAL EQUATIONS.—

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 30.

93. (I) **ADVANCED CALCULUS.**—The real number system, sequences, elementary theory of functions of one variable and of several variables, Riemannian integration, line integrals, Green's theorem.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 91.

94. (II) **ADVANCED CALCULUS.**—Double and triple integrals, improper integrals, gamma functions, Beta functions, elliptic functions, calculus of variations, Fourier Lines, Laplace Transforms.

3 class hours.

Credit, 3.

THE DEPARTMENT.

Prerequisite, Mathematics 93.

Astronomy and Meterology

57. (I) **METEOROLOGY.**—A consideration of weather elements, air masses, frontal structures and storms, the construction and interpretation of weather maps and the general principles of weather forecasting. Not offered 1953-54.

2 class hours.

Credit, 2.

8:00-8:50 Tu. Th.

Mr. LANPHEAR.

58. (II) **ASTRONOMY.**—The course deals with a consideration of the atmosphere through which astronomical phenomena are observed; fundamental conceptions of the celestial sphere, the solar system, stars, galaxies. The chief objective is to make the student alive to the beauty and order revealed in the sky. Not offered 1953-54.

2 class hours.

Credit 2.

8:00-8:50 Tu. Th.

Mr. LANPHEAR.

MILITARY SCIENCE AND TACTICS

Colonel SHAW, PMST, Lieutenant Colonel GAUTHIER, Assistant

PMST, Major TRAGLE, Assistant PMST, Major PETERS,

Assistant PMST, Captain COOKINGHAM, Assistant

PMST, Captain POTTLE, Assistant PMST.

1. (I) 2: (II).—Theoretical and practical instruction in leadership, drill and exercise of command; military organization; maps and aerial photographs; first aid and hygiene; and military policy of the United States, the National Defense Act, and ROTC.

3 scheduled hours.

First semester, Credit, 3.

Second semester, Credit, 2.

ARMY INSTRUCTORS.

25. (I) 26. (II).—Theoretical and practical instruction in leadership, drill and exercise of command; the tactics and techniques of the armored cavalry to include basic communications and basic motors; history and mission of armored cavalry; mechanical training with tank weapons; scouting and patrolling; and individual and crew served weapons. Emphasis is placed on the functions, duties, and responsibilities of junior noncommissioned officers in the capacity of squad borders, assistant squad leaders, guides, and guidon bearers.

3 scheduled hours.

Credit, 2.

ARMY INSTRUCTORS.

51. (I) 52. (II).—Theoretical and practical instruction in leadership, drill and exercise of command; the tactics and techniques of the armored cavalry to include communications, tank gunnery, motors, tank driving; troop leading; and organization of armored units. Emphasis is placed on the functions, duties, and responsibilities of senior non-commissioned officers.

5 scheduled hours.

Credit, 3.

ARMY INSTRUCTORS.

75. (I) 76. (II).—Theoretical and practical instruction in leadership, drill and exercise of command; military law and military boards; military administration; military teaching methods; and the tactics and techniques of the armored cavalry to include combat intelligence, communications, tank gunnery, motors, tank driving; supply and evacuation; and new military developments. Emphasis is placed on the functions, duties, and responsibilities of junior commissioned officers.

5 scheduled hours.

Credit, 3.

ARMY INSTRUCTORS.

AIR SCIENCE AND TACTICS

Lieutenant Colonel PRATT, PAST, Lieutenant Colonel BARRETT, Assistant PAST, Major GRAPENTINE, Assistant PAST, Major WELLS, Assistant PAST, Major ZDROJKOWSKI, Assistant PAST, Captain GAUMOND, Assistant PAST, Captain MCCOLLOR, Assistant PAST, Captain HAMLIN, Assistant PAST, Captain SAGE, Assistant PAST, 1st Lieutenant COLE, Assistant PAST.

1. (I) 2. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, history and development of aviation, fundamentals of global geography, international tensions and security organizations, and instruments of national military security.

3 scheduled hours.

First semester, Credit, 3.

Second semester, Credit 2.

AIR FORCE INSTRUCTORS.

25. (I) 26. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, careers in the United States Air Force, and elements of aerial warfare, consisting of a study of targets, weapons, aircraft, the air ocean, bases, and forces.

3 scheduled hours.

Credit, 2.

AIR FORCE INSTRUCTORS.

51. (I) 52. (II).—Theoretical and practical instruction in leadership, drill and exercise of command, the air force commander and his staff, problem solving techniques, the communication process and air force correspondence, military law, courts and boards, air force base functions, and applied air science, consisting of a study of aircraft engineering, navigation, and weather.

5 scheduled hours.

Credit, 3.

AIR FORCE INSTRUCTORS.

75. (I) 76. (II).—Theoretical and practical instruction in leadership, drill, and exercise of command, military aspects of world political geography, military aviation, and the evolution of warfare. Emphasis will be placed on preparation for commissioned service, and career guidance.

5 scheduled hours.

Credit, 3.

AIR FORCE INSTRUCTORS.

MUSIC

APPLIED MUSIC.—Practical work in vocal or instrumental music at an appropriate cost of \$60.00 per semester.

15 1-hour lessons.

No credit.

25. (I) 26. (II) FUNDAMENTALS OF MUSIC.—A study of the structure of music to meet the practical needs of the listener, performer, or creator. Sight singing, ear training, and keyboard practice are used to give context to the acquired music theory. All music majors are required to study piano while following this course.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

1:00-3:50 Tu., 1:00-2:50 Th.

THE DEPARTMENT.

27. (I) 28. (II) VOCAL OR INSTRUMENTAL MUSIC.—This course is designed to improve the playing of instruments and/or the use of the singing voice, and to create further appreciation of music by actual performance. Students electing this course should take both Courses 27 and 28. Admission by permission of the instructor.

1 class hour.

Credit, 1.

Hour by arrangement.

THE DEPARTMENT.

29. (I) 30. (II) ADVANCED INSTRUMENTAL OR VOCAL ENSEMBLE.—A continuation of Music 27 and 28 for the training

of performers in combinations for voices or instruments. Solo performance and program planning are discussed and practiced. Students taking Course 29 should also take Course 30.
1 class hour. Credit, 1.

Hour by arrangement.

THE DEPARTMENT.

51. (I) and (II) DISCOVERING MUSIC.—This elementary course is non-technical and is designed primarily for those students who would like to acquire a general background and knowledge of this art. With learning to listen its motive, the course deals with the elements of music, forms in music, musical composition, and selected composers. Excerpts from works most frequently heard and performed will be used as illustrations.

3 class hours.

Credit, 3.

10:00-10:50 or 11:00-11:50 M. W. F.

Mr. ALVIANI.

52. (II) DISCOVERING MUSIC.—A continuation of Music 51. Students may register for this course without Music 51 if permission is granted by the instructor.

3 class hours.

Credit, 3.

Mr. ALVIANI.

55. (I) ORGANIZATION AND DIRECTION OF CHORAL GROUPS.—The aim of this course is to demonstrate the methods of developing school and community choral groups. Techniques and factors of good vocal performance are studied and practiced. The student may conduct choral groups during the semester. Previous musical experience is desirable. Admission by permission of the instructor.

2 class hours.

Credit, 2.

Hours by arrangement.

Mr. ALVIANI.

56. (II) ORGANIZATION AND DIRECTION OF INSTRUMENTAL GROUPS.—Different types of instrumental music, the problems of balancing instrumentation, the functioning of instruments are introduced by the members of the class. Previous musical experience is desirable. Admission by permission of the instructor.

2 class hours.

Credit, 2.

Hours by arrangement.

Mr. CONTINO.

61. (I) MASTERPIECES OF MUSIC.—Selected masterpieces from musical literature are intensively analyzed, and a relationship is drawn between the compositions and the social-cultural periods in the history of music.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. CONTINO.

Prerequisite, Music 51 or 52 recommended but not required.

62. (I) and (II) MUSIC IN THE ELEMENTARY GRADES.—Designed for the classroom teacher having little or no formal training in music, this course deals with the principles of musical development with particular emphasis on classroom presentation. Using the class as a laboratory, rote and reading songs are examined and processes of presentation are evaluated.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. CONTINO.

75. (I) 76. (II) MUSIC THEORY.—The development of skill in the use of music fundamentals. Elementary and advanced harmony are studied and practiced. Techniques of elementary counterpoint are presented to show their relationship to vocal and instrumental music.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu. Th.; 1:00-2:50 W.

THE DEPARTMENT.

77. (I) 78. (II) FORM AND ANALYSIS.—An approach to the study of music through observation of its forms, analysis of its rhythms, melodies, and harmonies as used in the vocal and instrumental compositions of various periods in the historical development of music. The theory of conducting is discussed, studied, evaluated, and its techniques practiced.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 F.; 10:00-11:50 M. W.

THE DEPARTMENT.

79. (I) SCORE READING AND ANALYSIS.—Through listening and reading assignments the characteristics of voices and instruments are studied and the results are applied to practical arranging for vocal and instrumental groups of various types, sizes, and combinations.

3 class hours.

Credit, 3.

THE DEPARTMENT.

80. (II) SCORE READING AND COMPOSITION.—A continuation of Music 79. In this course the student is expected to study the methods and materials of original composition. Procedures for processing, printing, publishing, and marketing are examined. Laws and regulations governing performance, publication, personnel, and other related activities are discussed.

3 class hours.

Credit, 3.

THE DEPARTMENT.

81. (I) MUSIC AND HISTORY.—A comprehensive study of the periods in music history—Renaissance, Baroque, Classic, Romantic, and Modern—so that the student may feel their quality, understand their enthusiasms, recognize their resources and limitations, and identify their habits of thought and style.

3 class hours.

Credit, 3.

THE DEPARTMENT.

82. (II) MUSIC AND RESEARCH METHODS.—Recommended to students interested in bibliography, references, source materials, rental libraries, etc., who expect to work in the field of music or related fields. In addition to compilation, the student will investigate a special area of study and report the findings in written form.

3 class hours.

Credit, 3.

THE DEPARTMENT.

OLERICULTURE

Professor SNYDER, Assistant Professor TUTTLE,
Mr. JOHNSON.

25. (I) GENERAL OLERICULTURE.—A study of the factors affecting the growth of plants which are essential to a basic understanding of the cultural requirements of vegetable and other horticultural crops.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. JOHNSON.

51. (I) PLANT NUTRITION.—A critical study of the water and nutrient requirement of vegetable plants as applied to irrigation, soils and their preparation, manures, fertilizers, lime, green manures and crop residues.

3 class hours.

Credit, 3.

8:50-8:50 M. W. F.

Mr. TUTTLE.

52. (II) PLANT CULTURE.—A study of certain environmental factors which influence the culture of vegetables as applied to actual commercial practices.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. JOHNSON.

73. (I) VEGETABLE MARKETING PRACTICES.—A consideration of the various factors, techniques, and methods in harvesting and preparing vegetables for market, including marketing centers, production areas, market and consumer preference, packing house facilities equipment, and pre-market storage. Trips to nearby growers and markets will be required at a cost of not over ten dollars.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

Prerequisite, Agricultural Economics 55.

74. (II) MERCHANDISING OF PERISHABLES.—Discussion and demonstrations in this course will include the various techniques, practices, and methods that are used in selling and distributing horticultural commodities through both wholesale and retail outlets from the farm to the ultimate

consumer. Trips to the Boston and New York markets may be elected by the student at a reasonable cost.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. SNYDER.

75. (I) **SYSTEMATIC OLERICULTURE.**—A detailed study of variety identification; nomenclature and classification; history, variety improvement and seed sources; judging and exhibiting.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Hours by arrangement.

Mr. SNYDER.

76. (II) **GREENHOUSE CROPS AND PLANT GROWING (1954-55).**—A study of the culture of greenhouse crops including cucumbers, tomatoes, lettuce, rhubarb, and mushrooms; the growing of seeding plants both under glass and in the open for local retail or wholesale business.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. JOHNSON.

78. (II) **COMMERCIAL OLERICULTURE.**—A study of the problems in the commercial production of vegetables; general culture, fertilizers and manures, machinery, labor, harvesting, and marketing. One or two trips to important markets and truck growing sections are required. Twenty-five dollars will cover the cost of these trips.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Hours by arrangement.

Mr. TUTTLE.

81. (I) 82. (II) **SEMINAR.**—Advanced study of problems relating to vegetable production.

1 class hour.

Credit, 1.

Hours by arrangement.

THE DEPARTMENT.

PHILOSOPHY

Professor GLICK, Assistant Professor SHUTE.

61. (I) **INTRODUCTION TO PHILOSOPHY.**—A general approach to philosophy both from the standpoint of method and content; an attempt to understand and evaluate contemporary ideas.

3 class hours.

Credit, 3.

Mr. GLICK.

62. (II) **HISTORY OF PHILOSOPHY.**—A survey of the development of western thought from the early Greeks to the present.

3 class hours.

Credit, 3.

Mr. GLICK.

63. (I) LOGIC.—A study of the principles, problems and methods of critical thinking; emphasis upon principles and methods of formal logic; critical study of inductive reasoning and scientific method with applications to current problems.

3 class hours.

Credit, 3.
Mr. GLICK.

64. (II) ETHICS.—The meaning of good and evil, right and wrong; survey of ethical theories and practices both historical and contemporary; an attempt to evaluate these theories with reference to modern ethical problems.

3 class hours.

Credit, 3.
Mr. GLICK.

81. (I) PHILOSOPHY OF RELIGION.—A survey of the contrasting types of religious philosophy in the contemporary western world and Asia, with a critical and constructive study of basic issues, such as the meaning of knowledge in the field of religion, the nature of faith, and the religious interpretation of reality.

3 class hours.

Credit, 3.
Mr. SHUTE.

82. (II) AESTHETICS.—A study of the leading modern theories of the nature of art, the analysis of aesthetic experience, the distinctive function of art in culture and personality, and the principles of criticism.

3 class hours.

Credit, 3.
Mr. SHUTE.

83. (I) READINGS IN ANCIENT PHILOSOPHY.—Selections are read from Plato's dialogues and from the works of Aristotle. A study is made of the leading philosophical issues discussed by these writers, with emphasis on ideas which became basic in the development of western thought.

3 class hours.

Credit, 3.
Mr. SHUTE.

84. (II) READINGS IN MODERN PHILOSOPHY.—Selections are read from Locke, Hume, Kant, and Whitehead, to display the leading ways in which modern thinkers have looked upon the nature of the universe and the possibilities and limitations of knowledge.

3 class hours.

Credit, 3.
Mr. SHUTE.

85. (I) METAPHYSICS.—The field of metaphysics defined in distinction from the field of science, contrasting theories of reality offered by contemporary naturalism and idealism, especially in the light of recent developments in biological and physical science; analysis of basic ideas which will enable

the student to continue a fruitful development of his own philosophy .

3 class hours.

Credit, 3.
Mr. SHUTE.

86. (II) THEORY OF KNOWLEDGE.—Types of knowledge and correlated methods of knowing; questions of certainty, probability, and limits of knowledge; ways of expression, such as mathematical formulae, language, and art, and their involvement in the knowing process; the nature of the relation between the knowing subject and the known object.

3 class hours.

Credit, 3.
Mr. SHUTE.

PHYSICAL EDUCATION FOR MEN.

Professor MCGUIRK, Professor KAUFFMAN, Professor LORDEN, Professor O'ROURKE, Associate Professor DERBY, Associate Professor BRIGGS, Associate Professor ROGERS, Associate Professor GLADCHUK, Assistant Professor CURRAN, Assistant Professor RICCI, Mr. BALL, Mr. SALWAK, Mr. KOSAKOWSKI, Mr. MASSUCCO.

Activity Courses

3. (I) 4. (II) PHYSICAL ACTIVITY COURSE.—The object of the course is to help every student, through regularity and continuity of physical activity, to realize not only his physical and mental capacities, but learn to use them as an intelligent, cooperative, and efficient citizen. The students are given motor ability tests, expected to learn to swim and to meet minimum standards in the basic skills through participation in team sports and exercise.

3 class hours.

Credit, 1.
THE DEPARTMENT.

33. (I) 34. (II) PHYSICAL EDUCATION.—A continuation of Physical Education 3 and 4.

3 class hours.

Credit, 1.
THE DEPARTMENT.

Skills and Techniques in Physical Education

The following courses are concerned with the methods and techniques of applied physical education and are primarily for students enrolled for degree or teaching credentials in physical education. Classroom presentation, field, court and floor demonstrations: Non-major admission only by permission of the instructor.

5. (I) 6. (II) SKILLS AND TECHNIQUES.—Teaching and organizing groups for participation in touchfootball, basketball, skiing, swimming, and softball.

4 laboratory hours.

Credit, 1.
THE DEPARTMENT.

35. (I) SKILLS AND TECHNIQUES.—Teaching and organizing groups for participation in soccer, speedball, track and field.

4 laboratory hours.

Credit, 1.

THE DEPARTMENT.

36. (II) SKILLS AND TECHNIQUES.—Instruction in techniques of teaching elementary apparatus, tumbling and pyramids with emphasis on construction of gymnastic routines and formulation of demonstrations.

4 laboratory hours.

Credit, 1.

THE DEPARTMENT.

63. (I) 64. (II) SKILLS AND TECHNIQUES.—Teaching and organizing groups for participation in golf, badminton, boxing, archery.

4 laboratory hours.

Credit, 1.

THE DEPARTMENT.

83. (I) 84. (II) SKILLS AND TECHNIQUES.—Teaching and organizing groups for participation in tennis, wrestling, rhythmic, volleyball, angling.

4 laboratory hours.

Credit, 1.

THE DEPARTMENT.

21. (I) HISTORY AND PURPOSES OF PHYSICAL EDUCATION.—A brief study of the history of the development of the various systems of physical education and a study of the aims and ideals of present-day physical education.

3 class hours.

Credit, 3.

Mr. KAUFFMAN.

43. (I) OFFICIATING.—Technique and practice in officiating football and soccer.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

Mr. MASSUCCO, Mr. BRIGGS.

44. (II) OFFICIATING.—Technique and practice in officiating basketball and baseball.

1 class hour; 1 2-hour laboratory period.

Credit, 1.

Mr. CURRAN, Mr. LORDEN.

51. (I) HUMAN ANATOMY.—A course in structural human anatomy.

3 class hours.

Credit, 3

Mr. RICCI.

52. (II) APPLIED ANATOMY AND KINESIOLOGY.—A course aimed to give the anatomical application basal to a thorough understanding of the mechanical problems in apparatus, athletic, and corrective exercises.

3 class hours.

Credit, 3.

Mr. KAUFFMAN.

Prerequisite, Physical Education 51.

53. (I) PHYSICAL EDUCATION—ELEMENTARY SCHOOL.—This course includes the objectives, organization, significance, and content of physical education in the grade schools. The course is correlated with the requirements of the State Department of Education.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. DERBY.

54. (II) PHYSICAL EDUCATION—SECONDARY SCHOOLS.—The course includes the objectives, organization, significance, and content of physical education in the secondary schools. The course is correlated with the requirements of the State Department of Education.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. DERBY.

55. (I) TESTS AND MEASUREMENTS.—This course considers the status of measurement in physical education, an historical sketch, typical of contributions in anthropometrics, strength tests, ability and achievement tests, cardiac functional tests, neuro-muscular control tests, and sports technique tests; and it includes the tools of measurement, indices, and the theory and practice of test administration.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. SALWAK.

58. (II) ORGANIZED CAMPING ADMINISTRATION.—This course includes the history of organized camping, minimum standards of health and safety, the development of camping philosophies, trends, and the camping industry.

3 class hours.

Credit, 3.

Mr. ———.

59. (I) SCOUTING ELEMENTS AND PRINCIPLES.—A course in scouting education with emphasis on aims, methods and program content and their effect upon the character of youth and his training for citizenship.

1 class hour; 1 2-hour laboratory period.

Credit, 3.

Mr. ———.

71. (I) 72. (II) SPECIAL PROBLEMS COURSE.—Presentation and discussion of research work in physical education, health and safety education, or athletics.

3 class hours.

Credit, 3.

Mr. SALWAK and the DEPARTMENT.

74. (II) RECREATION—RECREATION LAND USE.—Including types of recreational areas, recreational resources, recreational needs of the people, geography of recreation, competitors of recreational land use, economic aspects of federal, state, and local recreational systems.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. ———.

75. (I) ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION.—Problems and precedures in physical education, organization of program, class schedules, classification of students, equipment, records, finance, intramurals, construction and maintenance of gymnasias, swimming pools, locker rooms, and outdoor play areas.

3 class hours.

Credit, 3.
Mr. McGUIRK.

77. (I) COACHING.—This course outlines the coaching of football and soccer.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. O'ROURKE, Mr. BRIGGS.

78. (II) COACHING.—Continuation of Course 77. This course outlines the coaching of basketball, baseball, and track and field.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. CURRAN, Mr. LORDEN, Mr. DERBY.

79. (I) ADAPTIVE PHYSICAL EDUCATION.—A program of developmental activities, games, sports, and rhythms suited to the interests, capacities and limitations of students with disabilities who may not safely engage in unrestricted participation in the vigorous activities of the general physical education program.

3 class hours.

Credit, 3.
Mr. KAUFFMAN, Mr. RICCI.

Safety Education Section

22. (II) WATER SAFETY INSTRUCTOR COURSE.—This course includes training in senior lifesaving and the instructor Water Safety Course. Successful completion results in certification as American National Red Cross Water Safety Instructor. Some work is given in the conduct of competitive swimming, diving, canoeing, boating and recreational swimming programs.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.
Mr. ROGERS.

42. (II) FIRST AID INSTRUCTOR COURSE.—This course includes training in the standard, advanced and instructor First Aid Courses. Successful completion results in certification as American National Red Cross First Aid Instructor.

3 class hours.

Credit, 3.
Mr. BRIGGS.

85. (I) SAFETY EDUCATION INSTRUCTOR COURSE.—This course includes activities and procedures, in-school and out-of-school, designed to develop habits and attitudes that will lead to safe behavior thru experiences in desirable safety

practices. The course is designed primarily for seniors majoring in physical education and for elementary and secondary school teachers.

2 class hours.

Credit, 2.
Mr. BRIGGS.

86. (II) DRIVER EDUCATION INSTRUCTOR COURSE.—This course includes driver education and driver training at the instructor's level, and is designed to orient the student to live safely thru skillful and efficient behavior on streets and highways. Leads to certification as Massachusetts Registry of Motor Vehicles instructor in driver education and driver training.

2 class hours.

Credit, 2.
Mr. BRIGGS.

89. (I) ATHLETIC INJURIES—PREVENTION AND CARE.—The use of proper, personal and field equipment, support methods, conditioning exercises, the medical examination, therapeutic aids, and the clinical use of physiotherapy equipment.

2 class hours.

Prerequisites, Physical Education 22, 51.

Credit, 2.
Mr. RICCI.

PHYSICAL EDUCATION FOR WOMEN

Professor TOTMAN, Miss HUBBARD, Mrs. HIBBARD, Miss RIGGS,
Miss CAMP, Miss BOUIN.

7. (I) 8. (II) PHYSICAL EDUCATION.—Students are required to participate in one term of dancing, in one team sport, and to pass a safety test in swimming. Except for these requirements, all unrestricted students may select any activity which is offered. Fall season: field hockey, volleyball, soccer, archery, tennis, swimming. Winter season: basketball, volleyball, badminton, swimming, life saving (by permission), modern dance, square dance, calisthenics, posture training. Spring season: softball, soccer, archery, swimming, modern dance.

3 class hours.

Credit, 2.
THE DEPARTMENT.

27. (I) 28. (II) PHYSICAL EDUCATION.—The activities offered in Courses 7 and 8 are continued. In addition, advanced modern dance is offered in the fall season and water safety instruction in the winter season. Unrestricted students may select any activity which is offered.

3 class hours.

Credit, 2.
THE DEPARTMENT.

63. (I) 64. (II) TEACHING SPORTS FOR SECONDARY SCHOOLS.—Designed to give the fundamentals of teaching and officiating of team sports for women appropriate for the

secondary school level. Course content includes development and knowledge of techniques, knowledge of rules, teaching progressions, class procedures, and instruction in officiating related to the following activities: hockey, soccer, speedball, volleyball, basketball, and softball.

1 class hour; 3 laboratory hours.

Credit, 2.

Miss RIGGS.

65. (I) **PLAY ACTIVITIES AND GAMES FOR ELEMENTARY SCHOOLS.**—A study of the place of physical education in the schools with emphasis on procedures, organization, and teaching techniques. There will be more opportunity to learn games and other play activities for children from 5 to 14 years.

1 class hour; 3 laboratory hours.

Credit, 2.

Miss TOTMAN.

66. (II) **RHYTHMS AND DANCING FOR THE ELEMENTARY SCHOOL.**—The course will include the development of rhythmic sense through basic motor skills; dramatizations; the construction of simple dance forms; folk dances and singing games. There will be practice in planning the rhythm and dance program in the elementary school from nursery school through sixth grade.

1 class hour; 3 laboratory hours.

Credit, 2.

Miss HUBBARD.

PHYSICS

Professor POWERS, Professor ALDERMAN, Associate Professor ROSS, Assistant Professor MATHIESON, Assistant Professor FISHER, Assistant Professor WANG, Mr. CROOKER.

25. (I) **MECHANICS, SOUND, AND HEAT.**—This course is largely a study of the following and related topics; equilibrium of bodies; forms of energy and work; motion, fluids; surface tension; molecular phenomena; elasticity; wave-motion; sound; thermometry expansion; hygrometry; transmission of heat; changes of state; radiation.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

THE DEPARTMENT.

Prerequisite, Mathematics 8 or its equivalent.

26. (II) **LIGHT AND ELECTRICITY.**—Includes wave-theory of light; optical instruments; analysis of light; interference; polarization; magnetism; electrostatics; production and properties of electric currents; electrical appliances and machines; oscillatory circuits; vacuum tubes, and related topics.

3 class hours; 1 2-hour laboratory period.

Credit, 4.

THE DEPARTMENT.

27. (I) GENERAL PHYSICS.—The topics covered are mechanics, sound, and heat with special emphasis on the mathematical development of statics, centroids, and Gauss' theorem.

3 class hours; 1 2-hour laboratory period. Credit, 4.

THE DEPARTMENT.

Prerequisites, Mathematics 5, 6, or equivalent; Mathematics 31 previously or concurrently.

28. (II) GENERAL PHYSICS.—The topics covered are light and electricity with special emphasis on the mathematical development of Gauss' theorem, dielectrics and A.C. electricity.

3 class hours; 1 2-hour laboratory period. Credit, 4.

THE DEPARTMENT.

Prerequisite, Physics 27.

51. (I) 52. (II) MAGNETISM, ELECTRICITY, PHOTO-ELECTRICITY, THERMIONICS AND APPLICATIONS.—Course 51 deals with direct currents; Course 52 with alternating currents, applications of thermionics, and photo-electricity. These courses are planned to give the student a good training in theory and methods of measurement in the indicated subjects, which are useful in many fields of investigation. Modern methods are stressed and instruments of precision are used. 2 class hours; 1 2-hour laboratory period. Credit, 3.

8:00-8:50 Tu., Th.; 10:00-11:50 Tu. or 1:00-2:50 Tu. or W.

Mr. POWERS.

Prerequisites, Physics 26 and Mathematics 29 for Course 61; Physics 51 for Course 52.

55. (I) 56. (II) MECHANICS.—Development of the fundamental concepts of dynamics with applications to particles and rigid bodies in translation and rotation. One laboratory period may be substituted for one class hour.

3 class hours. Credit, 3.

9:00-9:50 Tu., Th.; laboratory by arrangement.

Mr. ROSS.

Prerequisites, Physics 26; Mathematics 30.

58. (II) PHOTOGRAPHY.—Class work and laboratory practice in the fundamentals of photography. Types of cameras, characteristics of photographic emulsions, exposure and exposure meters, processing of negative and prints, enlarging, composition. Limited to ten students.

2 class hours; 1 4-hour laboratory period. Credit, 3.

3:00-3:50 M. W.; 1:00-5:00 F.

Mr. POWERS.

60. (II) SOUND AND ACOUSTICS.—A study of vibrations, vibrating bodies, coupled systems, sound structure, and acous-

tic properties. The work will include many applications of sound to technical and commercial fields.

3 class hours.

Credit, 3.

Mr. ALDERMAN.

Prerequisite, Physics 55 or its equivalent.

61. (I) 62. HEAT AND THERMODYNAMICS.—A study of heat exchanges and energy changes due to heat in systems of matter. The subject material and experimental methods are useful in other branches of science.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu., Th.; laboratory by arrangement.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

63. (I) 64. (II) OPTICS.—An intermediate course in the theory of light. Work in geometrical and physical optics is done. Precision instruments are used in the laboratory.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

1:00-1:50 Tu., Th.; laboratory hours by arrangement.

Mr. ALDERMAN.

Prerequisites, Physics 26; Mathematics 29.

75. (I) 76. (II) ADVANCED EXPERIMENTAL WORK IN SELECTED TOPICS.—These courses are largely experimental and the subject matter is adapted to the needs of the individual student. The research viewpoint is emphasized. The class hour is used for a course in precision of measurements.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

Mr. WANG.

Prerequisites, Mathematics 29, 30; two of the following year courses: Physics 51-52, 55-56, 61-62, 53-64.

85. (I) 86. (II) MODERN PHYSICS.—Typical subjects studied are theories of the atom, radiation, quantum theory; spectra, X-ray analysis, nuclear reactions.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

THE DEPARTMENT.

Prerequisites, Physics 52, 62 and 64 or equivalent; Mathematics 30.

95. (I) 96. (II) ELECTRONICS.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 M. F.; 10:00-11:50 W.

Mr. POWERS, Mr. WANG.

Prerequisites, Physics 51, 52; Mathematics 29, 30.

POMOLOGY

Professor FRENCH, Associate Professor ROBERTS,
Mr. J. F. ANDERSON, Mr. FISH.

26. (II) SMALL FRUITS.—A study of the growing of raspberries, blackberries, strawberries, currants, blueberries, cranberries, and grapes, dealing with such questions as varieties, selecting a site for the plantation, soils, fertilizers, pruning, harvesting, and marketing.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 M. F.; 1:00-2:50 W. or F. Mr. ANDERSON.

53. (I) GENERAL POMOLOGY.—A study of the most improved practices in tree fruit production, including orchard sites and soils, laying out and setting the orchard, the structure and growth of fruit plants; the bearing habits, pruning, fertilizers, pollination; pest control; harvesting and marketing the crop.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 Tu., Th.; 3:00-4:50 Th. or F.
Mr. ROBERTS, Mr. ANDERSON.

56. (II) ORCHARD PEST CONTROL.—This course is especially designed to familiarize the student with: (a) spraying and dusting machinery; (b) methods in the application of materials used in orchards, with the important considerations for spraying each fruit and for combating each orchard pest; (c) preparation for use of the common fungicides and insecticides.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu., Th.; 1:00-2:50 Tu. Mr. ROBERTS.

57. (I) FRUIT JUDGING.—Practice in the identification, selection, and judging of fruit for exhibition purposes. From this class a team is selected to represent the University in Intercollegiate Fruit Judging Contests.

1 class hour. Credit, 1.
Hours by arrangement. Mr. ANDERSON.

75. (I) SYSTEMATIC POMOLOGY (1954-55).—A study of the more important kinds and varieties of fruits grown in the United States, their relationships and nomenclature. Particular emphasis is placed upon the identification, classification and value of varieties including a study of the characters of the plant as well as the fruit. Given in alternate years.

1 class hour; 3 2-hour laboratory periods. Credit, 4.
8:00-8:50 Tu.; 1:00-2:50 M. W. F. Mr. ANDERSON.

77. (I) COMMERCIAL POMOLOGY (1953-54).—A critical consideration of the picking, grading, packing, storing, and marketing of fruits. This course also considers the leading

American and foreign centers of fruit production as they affect our own fruit industry through competition here or abroad. A two-day market trip will be required at an approximate cost of ten dollars. Given in alternate years.

2 class hours; 1 2-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 1:00-2:50 Tu. Mr. ROBERTS.

81. (I) 82. (II) ADVANCED POMOLOGY.—A consideration of the scientific principles governing the growth and behavior of fruit-bearing plants. Special attention is given to the more important research work in the field of pomology.

2 class hours; 1 2-hour laboratory period. Credit, 3.
Hours by arrangement. Mr. FRENCH.
Prerequisite, Pomology 53.

83. (I) 84. (II) SEMINAR.—Advanced study of problems relating to fruit production.

1 class hour. Credit, 1.
Hours by arrangement. THE DEPARTMENT.

85. (I) 86. (II) CRANBERRY PROBLEMS.—For seniors specializing in cranberry technology. Selected readings and individual work to familiarize students with the literature, research, and problems of the cranberry industry.

Hours by arrangement. Credit, 2.
Mr. FRENCH.

Plant Breeding

52. (II) PLANT BREEDING METHODS.—An advanced study of genetic topics peculiar to plants, also the methods and problems of the plant breeder. Laboratory work in genetic analysis and the breeding of plants.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 M. F.; 3:00-4:50 W. Mr. FRENCH.
Prerequisite, Zoology 53.

81. (I) 82. (II) SPECIAL PROBLEMS IN PLANT BREEDING.—Qualified seniors may carry on advanced study on special topics or undertake such original investigations as time and available material will permit.

Hours by arrangement. Credit, 2.
Mr. FRENCH.

Prerequisite, Plant Breeding 52.

POULTRY HUSBANDRY

Professor JEFFREY, Professor SANCTUARY, Assistant Professor BANTA, Assistant Professor VONDELL.

25. (I) GENERAL POULTRY.—For students not majoring in poultry husbandry. A general course giving an introduction to the breeds of poultry, the principles and practice of breeding, incubation, and poultry nutrition, brooding and rearing,

houses and equipment, management practices, disease control, marketing poultry products, and the business of poultry keeping.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 M. F.; 10:00-11:50 or 3:00-4:50 Tu.

Mr. JEFFREY.

52. (II) INCUBATION AND BROODING.—This course is based upon the actual operation of incubators and brooders. Each year a research project is planned and data obtained concerning the effects of various incubator adjustments upon malpositions and male development of embryos and the percentage of hatch. Studies of temperature gradients, chick behavior and development are made in brooding with various types of equipment. Analysis is made of common and unusual field problems.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

11:00-11:50 W.; 3:00-4:50 M.; other hours by arrangement.

Mr. SANCTUARY.

53. (I) POULTRY JUDGING.—Physiological and anatomical characters are used in production judging. The American Standard of Perfection is employed in a study of the more popular breeds and varieties, and for exhibition judging. Judging teams competing in the Eastern Intercollegiate Contest are trained in this course.

1 class hour; 2 2-hour laboratory periods. Credit, 3.

8:00-8:50 Tu.; 1:00-2:50 Th. F. Mr. BANTA.

55. (I) POULTRY HOUSING AND SANITATION.—In this course are considered the biological factors related to the proper physical environment necessary for growth, health, and reproduction. Various systems of ventilation and methods of insulation are studied and demonstrated by models. Humidity, temperature, and condensation studies are made at the poultry plant with varying adjustments of ventilation devices. A study is made of modern equipment. Sanitation from the standpoint of disease prevention practices is also considered.

1 class hour; 1 2-hour laboratory period. Credit, 2.

9:00-9:50 Th.; 1:00-2:50 Tu. Mr. SANCTUARY.

56. (II) POULTRY NUTRITION.—A study of the scientific principles of nutrition, classification and identification of feedstuffs, formulation and calculation of rations for specific purposes. A class trip may be arranged.

2 class hours; 1 2-hour laboratory period. Credit, 3.

9:00-9:50 Tu. Th.; 1:00-2:50 W. Mr. BANTA.

75. (I) **MARKETING POULTRY PRODUCTS.**—A study of the preparation and grading methods of eggs and poultry products to meet the requirements of the northeastern markets. The laboratories are designed to cover the fields of modern dressing, processing and packaging of poultry; as well as grading, candling and quality studies of eggs. A one-half day class trip to Springfield markets in December is required. Estimated cost, two dollars.

1 class hour; 1 2-hour laboratory period. Credit, 2.
10:00-10:50 Tu.; 3:00-4:50 W. Mr. VONDELL.

76. (II) **TURKEY PRODUCTION.**—This course includes the production of ducks and geese but most of the time is given to the turkey industry; its importance, breeds, breeding, incubation, brooding, feeding, finishing, marketing, etc.

1 class hour; 1 2-hour laboratory period. Credit, 2.
1:00-1:50 M.; 3:00-4:50 W. Mr. VONDELL.

77. (I) **POULTRY BREEDING.**—The improvement of poultry by selection is developed through a study of the principles of heredity. The inheritance of morphological and physiological characters including plumage color, egg production, meat production, hatchability, egg traits, and disease resistance.

2 class hours; 1 2-hour laboratory period. Credit, 3.
11:00-11:50 M. W.; 1:00-2:50 W. Mr. JEFFREY.

78. (II) **SEMINAR AND FARM MANAGEMENT.**—A combination seminar and lecture course designed to give the student a comprehensive view of all phases of the poultry industry. A field trip covering approximately three days will be arranged. Poultry majors with an average of 80 or more in poultry courses may elect an additional problem credit.

3 class hours; 1 2-hour laboratory period may be elected. Credits, 3, 4.
9:00-9:50 M. W. F. Mr. JEFFREY.

PSYCHOLOGY

Professor NEET, Associate Professor FELDMAN, Associate Professor GOSS, Assistant Professor VALLANCE,[†] Assistant Professor MAUSNER, Assistant Professor EPSTEIN, Assistant Professor FIELD, Mr. ERLICK, Mr. BIEHLER, Mrs. FIELD.

26. (I) and (II) **GENERAL PSYCHOLOGY.**—This is an introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. Topics considered include the nature

[†] On leave of absence.

and development of behavior, motivation, learning, problems of adjustment, intelligence, aptitudes, and personality.

3 class hours.

Credit, 3.

THE DEPARTMENT.

28. (II) GENERAL PSYCHOLOGY. — A continuation of Psychology 26. Topics considered include neural relationships, sensory processes, perception, thinking, emotions, social behavior, and individual differences.

3 class hours.

Credit, 3.

9:00-9:50 or 11:00-11:50.

THE DEPARTMENT.

Prerequisite, Psychology 26.

51. (I) EXPERIMENTAL PSYCHOLOGY. — This course is designed to give an understanding of the problems, methods, and data of experimental psychology. One of the basic functions of the course is to acquaint the student with the scientific method as applied to psychological studies of behavior.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

10:00-10:50 Tu. Th.; 1:00-2:50 Tu. W. or Th.

Mr. NEET.

Prerequisite, Psychology 26.

56. (II) EDUCATIONAL PSYCHOLOGY. — A study of psychological facts and principles fundamental to education, teaching, and personal relationships between teacher and pupil. Topics considered in relation to school situations are: physical and mental growth, intelligence, motivation, emotions, learning, transfer of training, and mental hygiene of teacher and pupil.

3 class hours.

Credit, 3.

9:00-9:50 Tu. Th. S.

Mr. MAUSNER.

Prerequisite, Psychology 26.

61. (I) SOCIAL PSYCHOLOGY. — The social behavior of the individual. Topics considered will include methods of studying social behavior, schools of social psychology, social behavior of animals, foundations of personality development, social (cultural) determinants of personality, social attitudes and their measurement, effects of collective situations on individual behavior, custom and conformity.

3 class hours.

Credit, 3.

9:00-9:50 M. W. F.

Mr. MAUSNER.

Prerequisite, Psychology 26.

62. (II) SOCIAL PSYCHOLOGY (1953-54). — A survey of multi-individual phenomena. Topics to be considered are methods of studying collective action, leadership, morale, propaganda, nature and measurement of public opinion,

behavior in crowd situations, social conflict and prejudice. Given in alternate years.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. MAUSNER.

Prerequisite, Psychology 26.

63. (I) **PHYSIOLOGICAL PSYCHOLOGY.**—A study of the relationships between physiological processes and behavior. Major emphasis will be placed upon the structure and mechanisms of the central nervous system and sense organs, endocrine functions, and drives.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. FELDMAN.

Prerequisites, Psychology 26; Zoology 35.

72. (II) **ADVANCED EXPERIMENTAL PSYCHOLOGY.**—The literature, techniques, and apparatus of experimental psychology are considered, and selected projects are carried out individually by the members of the class.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

10:00-10:50 Th.; 1:00-2:50 Tu. Th.

Mr. NEET.

Prerequisite, Psychology 51.

75. (I) **STATISTICS IN PSYCHOLOGY.**—The application of statistical procedures to the analysis of psychological data and to problems of measurement in psychology and related fields.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

2:00-2:50 M. F.; 2:00-3:50 W.

Mr. GOSS.

Prerequisites, Psychology 26; Statistics 79 or Mathematics 62.

81. (I) 82. (I) and (II) **PSYCHOLOGICAL TESTS.**—Different varieties of psychological tests are studied. The first semester surveys the field of testing and introduces the student to tests of intelligence, aptitude, interest, personality, and adjustment. The second semester is devoted to a more intensive study of individual intelligence tests with the aim of teaching the student to administer, score and interpret those in most common use. Either semester may be elected independently.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Course 81 (I) and 82 (II) 9:00-9:50 Tu. Th.; 3:00-4:50 W.

Course 82 (I) 3:00-3:50 Tu. Th.; laboratory by arrangement.

Mr. EPSTEIN.

Prerequisite, Psychology 26.

83. (I) **ABNORMAL PSYCHOLOGY.**—A study of the principles relative to the causes, symptoms, and treatment of behavior abnormalities. Special attention is given to the following: dynamics of behavior abnormalities, speech problems, emotional extremes, memory losses and other disorders

of association, the neuroses and psychoses, and mental deficiency. Hospital trips and clinics.

3 class hours.

10:00-10:50 M. W. F.

Credit, 3.

Mr. NEET.

Prerequisite, Psychology 26.

86. (I) and (II) INDUSTRIAL PSYCHOLOGY.—A study of psychological principles and methods in business and industrial situations. Topics considered include: job analysis, job evaluation, employee selection and training, fatigue, techniques of motivation, measurement of morale and problems of leadership.

3 class hours.

1:00-1:50 M. W. F. or 9:00-9:50 Tu. Th. S.

Credit, 3.

Mr. ERLICK.

Prerequisite, Psychology 26.

88. (II) PSYCHOLOGY OF GUIDANCE.—A study of the psychological principles, techniques and tests necessary in guidance. Practice is given in organizing and evaluating relevant data in the analysis of illustrative cases.

2 class hours; 1 2-hour laboratory period.

10:00-10:50 Tu. Th.; 2:00-3:50 M.

Credit, 3.

Mr. FIELD.

Prerequisite, Psychology 26 and 81 or consent of the instructor.

90. (II) CONTEMPORARY PSYCHOLOGIES.—A logical, historical, and systematic analysis of contemporary psychological theories, including structuralism, functionalism, Gestalt and organismic psychologies, psychoanalysis, and behaviorisms from Thorndike and Watson to the contemporary scene.

3 class hours.

2:00-2:50 M. W. F.

Credit, 3.

Mr. GOSS.

Prerequisite, Psychology 26.

92. (II) CLINICAL PSYCHOLOGY.—A study of the techniques and methods involved in the diagnosis and treatment of behavior disorders. Diagnostic clinical testing, counselling, and other psychotherapeutic procedures are given consideration. Hospital trips and clinics.

3 class hours.

11:00-11:50 M. W. F.

Credit, 3.

Mr. EPSTEIN.

Prerequisite, Psychology 83 or consent of the instructor.

93. (II) PSYCHOLOGY OF ADOLESCENCE (1954-55).—A consideration of the development, and emotional, social, and intellectual adjustment of the individual during the adolescent years. Given in alternate years.

3 class hours.

9:00-9:50 Tu. Th. S.

Credit, 3.

Mr. BIEHLER.

Prerequisite, Psychology 26.

94. (II) CHILD PSYCHOLOGY.—This course aims to develop an understanding of the behavior of the child. Psychological aspects of the following topics are considered: original nature, maturation and development of behavior, language, habit formation, emotional behavior, development of intelligence and understanding, social behavior, motivation, personality, and mental hygiene. Nursery school observation and practice.

3 class hours.

Credit, 3.

10:00-10:50 M. W. F.

Mr. BIEHLER.

Prerequisite, Psychology 26.

95. (I) 96. (II) PROBLEMS IN PSYCHOLOGY.—For qualified seniors. The student will be allowed to do independent work and study on special problems or in certain fields of psychological interest. By arrangement with the members of the department.

Credit, 1.

THE DEPARTMENT.

RECREATION

Assistant Professor PERRY.

51. (I) PRINCIPLES OF RECREATION.—This course considers recreation as an important social force in education and community living. Emphasis is given to the study and discussion of established principles and their applicability to functional recreation programs.

3 class hours.

Credit, 3.

Mr. PERRY.

52. (II) GROUP LEADERSHIP AND CAMP COUNSELING.—A study of principles and practices dealing with leadership problems, group work methods, camp counseling, and organization. Application is made to youth-serving agencies and organized camps through practical observations and demonstrations. Special attention is given to social and educational outcomes for adolescents.

3 class hours.

Credit, 3.

Mr. PERRY.

Prerequisite, Recreation 51.

53. (I) SOCIAL RECREATION (1955-56).—Provides leadership preparation in a wide range of social recreation for various age levels. Selecting and developing materials for use in actual situations is required. Opportunity is provided for practical experience in planning and conducting party games and mixers, group singing, social and square dancing, outings and picnics, and other mass activities for home,

church, club, camp, playground, hospital and institutional use. Given in alternate years.

3 class hours.

Credit, 3.

Mr. _____.

Prerequisite, Recreation 51.

54. (Summer) FIELD WORK EXPERIENCE.—Supervised off-campus field work experience is required of students preparing for leadership and teaching responsibilities in recreation and outdoor education. Assignments of one month are arranged for field experience during the summer following the junior year. Cooperating recreation centers, camps, schools, hospitals, industries, and other youth-serving organizations provide students with actual leadership preparation. Students are guided in their study through the use of a workbook adapted for the purpose and personal supervision. Placement arrangements should be made with the guidance of the major advisor as early as possible in the junior year. Required as excess graduation credits.

Mr. PERRY.

75. (I) FIELD WORK ANALYSIS.—A seminar for recreation majors. The course is planned primarily to discuss and evaluate supervised student leadership experience in community recreation, camping, and outdoor education. Student reports, staff appraisals, and workbook problems contribute to the analysis of field experience and student accomplishments.

3 class hours.

Credit, 3.

Mr. PERRY.

Prerequisite, Recreation 54.

76. (II) PUBLIC RELATIONS IN RECREATION.—This course is intended to provide opportunity for a study of the purposes and methods in developing and maintaining interest and understanding in public recreation. The course explores recommended programs and procedures for establishing good public relations and securing recreation as an important community affair. Provision is made for practical application and evaluation of selected techniques and their effectiveness in creating favorable public opinion.

3 class hours.

Credit, 3.

Mr. PERRY.

Prerequisite, Recreation 51.

77. (I) ORGANIZING AND CONDUCTING COMMUNITY RECREATION.—This course gives special attention to program planning for rural and urban recreation areas, neighborhood centers, adult education projects, and community activities. Organization and management including scheduling, staff assignments, record keeping, reports, special events, promotion and other departmental problems are considered.

3 class hours.

Credit, 3.

Mr. PERRY.

78. (I) or (II) SPECIAL PROBLEMS IN RECREATION.—Admission with approval of the major adviser. A qualified senior may elect to undertake independent study of a selected problem in the area of his primary interest or specialization. 3 class hours.

Credit, 3.
Mr. PERRY.

Prerequisite, Recreation 54.

RELIGION

(Non-credit courses)

Rev. SYDNEY TEMPLE, Ph.D.; Rabbi LOUIS RUCHAMES, Ph.D.;
Rev. Fr. DAVID J. POWER, A.B.; Rev. CHALMERS COE, B.D.;
Rev. HOWARD BOARDMAN, B.D.; Rev. JAMES LAIRD, Ph.D.

15. (I) 16. (II) A HISTORY OF JEWISH THOUGHT AND CULTURE.—A survey of Jewish thought and culture from the Bible to contemporary times. Particular emphasis will be placed upon the relevance of such thought to contemporary religious and philosophical problems. Among the thinkers to be discussed will be Jeremiah, Ecclesiastes, Philo, Maimonides, Spinoza, Achad-Ha'am, and Will Herberg.

1 hour.

No credit.
Mr. RUCHAMES.

17. (I) 18. (II) BASIC BELIEFS OF JUDAISM.—Discussions of the basic principles and practices of the Jewish faith.

1 hour.

No credit.
Mr. RUCHAMES.

20. (II) 21. (I) RELIGIOUS FOUNDATIONS OF THE WEST.—The development of religious consciousness is considered against the background of the Old Testament record. The Bible text is critically surveyed in the light of national, cultural, and rational influences and as applicable to the contemporary religious situation. Course 20: The Law and Former Prophets; Course 21: Prophets and Writings.

1 hour.

No credit.
Mr. TEMPLE.

30. (II) 31. (I) ELEMENTS OF CHRISTIANITY.—The fundamentals of the Christian faith as found in the New Testament writings are studied critically and empirically, with special reference to their relevance for individual and social life in the contemporary world. Course 30: The Four Gospels; Course 31: Acts and Epistles.

1 hour.

No credit.
Mr. TEMPLE.

41. (I) 42. (II) CATHOLIC FAITH AND PRACTICE.—Discussions of the Catholic Church dogmas and practices.

1 hour.

No credit.
Fr. POWER.

61. (I) THE UNDERSTANDING OF PERSONALITY.—The findings of modern psychology and psychiatry are interpreted in the light of the Christian faith so as to lead to a better understanding of the human personality. Courtship and marriage, vocation, personal and social attitudes are considered.
1 hour.

No credit.
Mr. LAIRD.

62. (II) SOCIAL ETHICS.—An examination of the Christian world view at it relates to the rights and duties of man in human society. The fundamental principles of justice, freedom, and love are considered in relation to their application in the areas of political and economic activity.
1 hour.

No credit.
Mr. BOARDMAN.

71. (I) RELIGION IN LIFE.—A practical approach to theology. The primary doctrines of the Christian Church are considered in the light of God's action and man's response, the place of the Church, and the task of the Christian today.
1 hour.

No credit.
Mr. TEMPLE.

72. (II) CHRISTIAN BELIEF.—An exposition and discussion of the articles of the Christian faith, with special attention to the scriptural basis of belief and its confirmation in the experience of the Church.
1 hour.

No credit.
Mr. COE.

Courses in Elementary and Intermediate Hebrew, and Elementary Yiddish are offered by Rabbi Ruchames. These are open to all students.

ROMANCE LANGUAGES

Professor FRAKER, Professor GODING, Associate Professor FERRIGNO, Assistant Professor CLARKE, Assistant Professor JOHNSON, Mr. CESTRE, Mr. WEXLER, Miss TILLONA, Mr. GREENFIELD, Miss BARTHE, Miss GEORGANTAS, Miss VEUM, Mr. GORE.

French.

1. (I) 2. (II) ELEMENTARY FRENCH.—For those who have had no previous courses in French. Intensive drill for rapid reading, writing, speaking and understanding. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Provost.

3 class hours; 1 laboratory hour.

Credit, 3.
THE DEPARTMENT.

5. (I) 6. (II) **ADVANCED INTERMEDIATE FRENCH.**—Readings from representative masterpieces of French literature. Composition, grammar review, intensive oral practice.

3 class hours; 1 laboratory hour.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 1 and 2, or 2 years of high school French.

9. (I) 10. (II) **ORAL PRACTICE.**—Not open to freshmen except in conjunction with another course in French. Intensive oral practice, vocabulary study, grammar essentials for fluent speech. Recommended for those who desire a reasonably good command of the spoken language.

3 class hours; 1 laboratory hour.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 5 and 6 or equivalent or permission of the instructor.

15. (I) 16. (II) **SURVEY OF FRENCH LITERATURE.**—Readings from representative masterpieces of French literature. Review of grammar. Composition, outside reading.

3 class hours; 1 laboratory hour.

Credit, 3.

THE DEPARTMENT.

Prerequisites, French 5 and 6 or 3 years of high school French.

Advanced Courses

Prerequisites, French 15 and 16, or French 5 and 6 and permission of the instructor. Since most of the advanced courses are conducted in French, the student should have a reasonable oral command of the language before electing these courses. For this purpose the student is advised to take French 9 and 10, or spend one year in the French House.

29. (I) 30. (II) **FRENCH LITERATURE OF THE SEVENTEENTH CENTURY (1953-54).**—A survey of the Classic period, with readings from representative works. Given in alternate years.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. FRAKER.

31. (I) 32. (II) **FRENCH LITERATURE OF THE NINETEENTH CENTURY (1954-55).**—A detailed study of the more important authors and movements. Given in alternate years.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. GODING.

51. (I) **FRENCH LITERATURE OF THE EIGHTEENTH CENTURY (1954-55).**—Rousseau: The Encyclopedists. Given in alternate years.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. FRAKER.

52. (II) VOLTAIRE (1954-55).—A study of the Eighteenth Century through the life and works of Voltaire. Given in alternate years.

3 class hours; 1 laboratory hour.

Credit, 3.
Mr. FRAKER.

53. (I) 54. (II) FRENCH LITERATURE OF THE TWENTIETH CENTURY.

3 class hours; 1 laboratory hour.

Credit, 3.
Miss CLARKE.

75. (I) 76. (II) COURS DE STYLE.—A study of syntax and idioms at an advanced level. The student is taught how to express himself clearly and logically in living French.

3 class hours; 1 laboratory hour.

Credit, 3.
Mr. CESTRE.

79. (I) FRENCH CIVILIZATION (1955-56).—A study of those elements which lie back of the cultural contribution of France to the world civilization. Subjects studied will include arts, sciences, school systems, the press, the family, social classes, influences of history and geography. The assigned readings will be drawn from contemporary French literature. Given in alternate years.

3 class hours; 1 laboratory hour.

Credit, 3.
Mr. GODING.

80. (II) ADVANCED LANGUAGE STUDY (1955-56).—Methods of teaching; review of grammar and pronunciation; outside reading and reports.

3 class hours; 1 laboratory hour.

Credit, 3.
Mr. GODING.

Italian

1. (I) 2. (II) ELEMENTARY ITALIAN.—For those who have had no previous courses in Italian. The essentials of Italian grammar, intensive drill in pronunciation, conversation and composition. Extensive reading of modern Italian writings. No credits in this course may be applied toward a degree until the close of the second semester except upon special recommendation from the Provost.

3 class hours; 1 laboratory hour.

Credit, 3.
Miss TILLONA.

25. (I) 25. (II) INTERMEDIATE ITALIAN.—Readings from modern authors and from Dante, Petrarch and Boccaccio. Intensive oral drill, continued composition and conversation. Systematic review of grammar.

3 class hours; 1 laboratory hour.

Credit, 3.
Mr. FERRIGNO.

Prerequisites, Italian 1 and 2 or two years of high school Italian.

SPANISH

1. (I) 2. (II) **ELEMENTARY SPANISH.**—For students who have had no training in Spanish. The essentials of Spanish grammar, intensive oral drill in pronunciation, fundamentals of conversation and composition, and extensive reading of short stories. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Provost.

3 class hours; 1 laboratory hour.

Credit, 3.

THE DEPARTMENT.

7. (I) 8. (II) **INTERMEDIATE SPANISH.**—Systematic grammar review, intensive oral drill, continued composition and conversation; intensive and extensive readings from selected modern texts.

3 class hours; 1 laboratory hour.

Credit, 3.

THE DEPARTMENT.

Prerequisites, Spanish 1 and 2 or two years of high school Spanish.

19. (I) 20. (II) **ORAL SPANISH.**—Primary emphasis is placed on the oral aspects of the language: pronunciation, vocabulary building, reading, comprehension, preparation of speeches, group discussions, and conversation. Considerable attention is also paid to those elements of grammar required for correct and fluent use of the language. Recommended for major students and for those who desire a good command of the spoken language.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. WEXLER.

Prerequisites, Spanish 7 and 8 or permission of the department.

25. (I) 26. (II) **SURVEY OF SPANISH LITERATURE.**—This course traces the development of Spanish literature from the 12th through the 20th centuries. Lectures, readings from some of the most important works, reports and discussions. The course is conducted largely in Spanish.

3 class hours; 1 laboratory hour.

Credit, 3.

Mr. FERRIGNO.

Prerequisites, Spanish 7 and 8 or equivalent.

29. (I) **THE ROMANTIC PERIOD (1954-55).**—Readings from representative authors; written and oral composition. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. FRAKER.

Prerequisites, Spanish 25 and 26.

30. (II) **THE MODERNISTS (1954-55).**—Dario, Nervo and their contemporaries; composition and conversation. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. FRAKER.

Prerequisite, Spanish 29.

73. (I) 74. (II) **THE GOLDEN AGE (1953-54).**—Readings from Cervantes, Lope de Vega, Calderon, Garcilaso and others. Composition and conversation. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. FRAKER.

Prerequisites, Spanish 25 and 26.

RUSSIAN

Instructor in Romance Languages.

51. (I) 52. (II) **ELEMENTARY RUSSIAN.**—Grammar, exercises in composition and conversation, selected readings. No credits in this course may be applied toward a degree until the close of the second semester, except upon special recommendation from the Provost.

3 class hours; 1 laboratory hour.

Credit, 3.
Mrs. JOA.

Prerequisite, previous language training.

SOCIOLOGY

Professor KORSON, Assistant Professor KING, Mr. DRIVER, Mr. MANFREDI, Mrs. McPHERSON, Mr. WILKINSON.

28. (I) and (II) **INTRODUCTION TO SOCIOLOGY.**—An outline study of the social order, and of the individual considered as a member of his various groups.

3 class hours.

Credit, 3.
THE DEPARTMENT.

51. (I) **URBAN SOCIOLOGY.**—A comparative study of modern social conditions, and methods of adjustment, with special reference to city environment. Characteristics of the population, urban ecology, and problems of adjustment in the fields of housing, health, education, and recreation are considered.

3 class hours.

Credit, 3.

2:00-2:50 Tu. Th., third hour by arrangement.

Mr. MANFREDI.

Prerequisite, Sociology 28.

52. (II) **RURAL SOCIOLOGY.**—A study of rural society from the standpoint of its population, institutions, standards of living, and their relation to urban society.

3 class hours.

Credit, 3.
Mr. MANFREDI.

Prerequisite, Sociology 28.

53. (I) AN INTRODUCTORY STUDY OF CULTURAL ANTHROPOLOGY.—A non-technical sociological study of man in pre-literate societies.

3 class hours.

Credit, 3.
Mr. LINDSTROM.

Prerequisite, Sociology 28.

54. (II) RACE RELATIONS.—The social, economic, and political aspects of racial problems in the United States, with particular reference to the Negro and major ethnic groups. A rabbi, minister, and priest are invited to address the class, and visits are made to the respective churches.

3 class hours.

Credit, 3.
Mr. KORSON, Mr. KING.

Prerequisite, Sociology 28.

57. (I) THE FAMILY.—The study of the development of the customs of courtship and marriage of the contemporary American family. The basic causes of changes and trends of the family are considered. Such topics as mate selection, marriage laws, marital prediction, husband-wife relations, and the role of the child are considered.

3 class hours.

Credit, 3.
Mr. KING, Mr. KORSON.

Prerequisite, Sociology 28.

61. (I) POPULATION PROBLEMS.—An analytical study of population trends and problems of the world; the origin, composition, growth, migration, and urbanization of the American population. A consideration of population pressure as a cause of migratory movements.

3 class hours.

Credit, 3.
Mr. WILKINSON.

Prerequisite, Sociology 28.

68. (II) INDUSTRIAL SOCIOLOGY.—A study of the role, status, and function of the worker in the industrial community. A consideration of changing technology, resulting social change and the adjustments made in the industrial community.

3 class hours.

Credit, 3.
Mr. KORSON.

Prerequisite, Sociology 28.

75. (I) SOCIAL PROBLEMS.—A consideration of the incidence, distribution and interrelations among the major types of social tensions in human societies. Various theories of causation are evaluated. In addition to regular classroom work, research projects and field trips are required.

3 class hours.

Credit, 3.
Mr. DRIVER.

Prerequisite, Sociology 28.

76. (II) INTRODUCTION TO SOCIAL WELFARE.—For senior majors and others who qualify. Contemporary problems of social concern: causes of poverty; methods of caring for adult and child dependents and defectives. A consideration of public and private agency administration and techniques, and an examination of federal, state, and local community programs. 3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisites, Sociology 28, 75.

78. (II) CRIMINOLOGY.—A study of the nature of crimes and the factors underlying criminal behavior. Attention is also given to the machinery of justice in criminal behavior; the law, the courts, police enforcement, penal and correctional institutions.

3 class hours.

Credit, 3.

Mr. DRIVER.

Prerequisites, Sociology 28, 75.

79. (I) 80. (II) SEMINAR.—Admission by permission of instructor. A study of the methods of research employed by social scientists. Students, under direction of the instructor, analyze and organize such sociological material as they gather through their own research. Projects must be approved in advance by the instructor.

Credit, 3.

Hours by arrangement.

Mr. DRIVER.

82. (II) SOCIOLOGICAL THEORY.—An examination of the contributions of European and American writers who have concerned themselves with theories of the origin, growth, and development of human social organization.

3 class hours.

Credit, 3.

Mr. MANFREDI.

Prerequisites, Sociology 28, 53.

SPEECH

Associate Professor NIEDECK, Assistant Professor ZAITZ, Mr. PEIRCE, Miss ABRAMSON, and the INSTRUCTORS IN ENGLISH.

3. (I) 4. (II) PUBLIC SPEAKING.—This course is designed to give the student introductory instruction and opportunity in oral self-expression and includes both public speaking and literary interpretation. Scheduled under English 1, 2.

1 class hour.

Credit, 1.

THE DEPARTMENT.

51. (I) VOICE AND DICTION AND ORAL INTERPRETATION.—The course is divided into five weeks of training and drill in the correct production of speech, followed by ten weeks of

practice in the fundamentals of vocal interpretation of literature. It is possible for a student to take the five weeks of voice and diction and receive one credit.

3 class hours.

Credit, 1 or 3.
Mr. _____.

61. (I) FUNDAMENTALS OF BROADCASTING.—A general introduction to broadcasting: practice in preparing, rehearsing, and producing programs of various types.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. ZAITZ.

71. (I) SCENE DESIGN AND CONSTRUCTION.—Theories and design in the modern theatre with assignments in developing stage settings from sketches to working drawing; from scenery construction to painting.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. _____.

75. (I) ACTING AND MAKE-UP.—The course is roughly divided into ten weeks of study of emotion and imagination in acting, reading lines, rehearsing, diction, and bodily action; and five weeks of study and application of the principles of stage make-up.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. _____.

76. (II) STAGE DIRECTION. — Study and practice in the fundamentals of directing a play. Recommended for those taking only one course in Drama.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. _____.

78. (II) STAGE LIGHTING.—Introduction to lighting a stage. Analysis of basic types of equipment and their application in artistic productions. Simple wiring and installations.

2 class hours; 1 2-hour laboratory period.

Credit, 3.
Mr. _____.

91. (I) (II) EXTEMPORE SPEECH.—The theory and practice of public speaking for business and professional purposes.

3 class hours.

Credit, 3.
Mr. NIEDECK, Mr. ZAITZ, Mr. PEIRCE.

92. (II) FORMAL DISCUSSION.—Most of the semester is devoted to formal discussion: its organization and presentation. Students are given the opportunity to lead and to participate in discussions of current problems.

3 class hours.

Credit, 3.
Mr. ZAITZ.

Prerequisite, Speech 91.

94. (II) PERSUASION.—Advanced study and practice in appeals to beliefs and actions through extemporaneous speech.
3 class hours. Credit, 3.

Mr. ———.

Prerequisite, Speech 91.

VETERINARY SCIENCE

Professor BULLIS, Professor SMITH.

75. (I) COMPARATIVE VETERINARY ANATOMY.—A study of the structure of vertebrates with emphasis upon the comparative structure of domesticated animals, both mammals and birds.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. SMITH.

76. (II) GENERAL VETERINARY PATHOLOGY.—An introduction to the study of disease—causes, transmission, structural changes, and defense mechanisms; and the application of these principles to the prevention, control, and eradication of the common communicable and non-communicable diseases of farm animals.

3 class hours.

Credit, 3.

11:00-11:50 M. W. F.

Mr. SMITH.

Prerequisite, Veterinary Science 75.

78. (II) GENERAL VETERINARY PATHOLOGY.—This course is similar to Veterinary Science 76 except that diseases of importance to wildlife, and diseases of animals transmissible to man will be considered.

3 class hours.

Credit, 3.

Mr. SMITH.

Prerequisites, Bacteriology 31, Zoology 35 or 71.

88. (II) AVIAN PATHOLOGY.—This course is similar to Veterinary Science 76 but with application to specific communicable and non-communicable diseases of poultry.

3 class hours.

Credit, 3.

8:00-8:50 M. W. F.

Mr. BULLIS.

Prerequisite, Veterinary Science 75.

ZOOLOGY

Professor WOODSIDE, Associate Professor SNEDECOR, Associate Professor BARTLETT, Assistant Professor TRAVER, Assistant Professor ROLLASON, Assistant Professor ANDREWS, Assistant Professor NUTTING, Assistant Professor RAUCH, Assistant Professor HONIGBERG, Mr. DEARDEN,† Mr. SWENSON, Mr. ROBERTS, Mr. GOLDSTEIN.

1. (I) and (II) INTRODUCTORY ZOOLOGY.—This course provides an introduction to the principles of biology, with

† On leave of absence.

special reference to the zoological aspects. The structure and activities of a representative vertebrate animal, the frog, are considered in detail and the knowledge thus gained is utilized in a comprehensive survey of the major groups of the animal kingdom. Brief introductions are given to the principles of classification, nutrition, structure, and functions of protoplasm, genetics, heredity, development, and evolution.

2 class hours; 1 3-hour laboratory period. Credit, 3.
11:00-11:50 M. W. or 2:00-2:50 M. W. or 3:00-3:50 Tu. Th.;
laboratory hours as sectioned.

THE DEPARTMENT.

25. (I) SURVEY OF THE ANIMAL KINGDOM.—Lectures emphasize those aspects of the zoological sciences which are least stressed in the introductory course; the principles of classification; ecology; economic importance; and the history of zoology in relation to man's progress. The laboratory work will include several exercises in field work; studies on representatives of phyla not covered previously; the morphological adaptations of animals to special modes of existence; and some simple zoological techniques.

2 class hours; 1 2-hour laboratory period. Credit, 3.
10:00-10:50 M. F.; 1:00-2:50 Tu. or W. or Th.

Mr. NUTTING.

Prerequisite, Zoology 1.

35. (I) and (II) VERTEBRATE PHYSIOLOGY.—An introductory course which will include consideration of circulation, respiration, digestion, metabolism, excretion, chemical and nervous coordination, muscular activity, and reproduction. The laboratory work will acquaint the student with some of the equipment and methods used in physiological studies, with emphasis on the experimental approach to the laboratory exercises.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mr. SNEDECOR, Mr. SWENSON, Mr. ROBERTS.

50. (II) HISTOLOGY OF THE VERTEBRATES.—A study of the types of tissues found in the body of vertebrate animals, and of the organs in which these tissues occur. Tissues and organs of mammals are emphasized. A knowledge of comparative anatomy is advised.

2 class hours; 1 3-hour laboratory period. Credit, 3.
8:00-8:50 Tu. Th.; 2:00-4:50 Tu. or 1:00-3:50 W.

Mr. ROLLASON.

Prerequisite, Zoology 1.

51. (I) and (II) MICROTECHNIQUE OF ANIMAL TISSUES.—The course comprises (1) a consideration of the principles and methods of microtechnique as applied to animal tissues, and (2) a series of practical exercises in the preparation of

animal tissues for microscopic examination. Registration is limited to 12 students per semester. Consult instructor for section assignments.

2 2-hour laboratory periods.

Credit, 2.

Mr. HONIGBERG.

Prerequisite, Zoology 1.

53. (I) PRINCIPLES OF GENETICS.—Lectures and laboratory experiments concerning the laws governing the transmission of hereditary factors in plants and animals, expression and action of genes, population genetics, and the relationship of genetics to other biological sciences.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. RAUCH.

Prerequisite, Zoology 1.

54. (II) NATURAL HISTORY—PHYSICAL.—Designed to orient students to the features of sky, climate and terrain which are of prime importance to the teaching naturalist. Collection, recording, preservation, and the use of natural objects will be stressed. Biological data will also be obtained as the season dictates.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

11:00-11:50 Tu.; 1:00-5:00 F.

Mr. NUTTING.

Prerequisites, Botany 1; Zoology 1.

55. (I) NATURAL HISTORY—BIOTIC.—An extension of Zoology 54 with emphasis upon the fauna and flora. This course is primarily concerned with the development, local distribution, responses, and interrelationships of these organisms. Their position with respect to the physical environment will be discussed in some detail.

1 class hour; 1 4-hour laboratory period.

Credit, 3.

11:00-11:50 Tu.; 1:00-5:00 F.

Mr. NUTTING.

Prerequisites, Botany 26; Geology 27; Zoology 54.

56. (II) NATURAL HISTORY—FIELD STUDIES.—A program of extensive field work growing out of preparation in Zoology 54 and 55. Emphasis upon seasonal differences in abundance and stage of development of our fauna and flora.

1 class hour; 1 2-hour laboratory period.

Credit, 2.

1:00-1:50 W.; 2:00-3:50 W.

Mr. NUTTING.

Prerequisite, Zoology 55 and permission of instructor.

69. (I) ANIMAL PARASITOLOGY.—Representative protozoan and helminthic parasites of man and domestic animals are studied, with special reference to their morphology and life cycles. Emphasis is placed upon parasitism as a mode of life; on host-parasite relationships; on vectors, and other modes

of transmission; and on methods of control of certain of the more important human parasites.

1 class hour; 2 2-hour laboratory periods. Credit, 3.
Miss TRAVER.

Prerequisite, Zoology 1.

70. (II) ADVANCED INVERTEBRATE ZOOLOGY.—A survey of the phyla of invertebrate animals from evolutionary and phylogenetic aspects. Morphology, modes of nutrition and reproduction, interrelationships with other animals, and distribution in time and space, are considered, as well as classification. For each phylum, representatives of the principal classes are studied. Marine, terrestrial and freshwater forms are included.

1 class hour; 2 3-hour laboratory periods. Credit, 3.
Miss TRAVER.

Prerequisite, Zoology 25 or equivalent.

71. (I) COMPARATIVE VERTEBRATE ANATOMY.—A thorough study of the anatomy of the vertebrates, with emphasis on the evolution, special modifications, and functional interrelationships of each of the organ systems. A systemic approach in both lecture and laboratory work. Animals studied in the laboratory are: protochordates, lamprey, dogfish, mudpuppy, and cat.

2 class hours; 2 3-hour laboratory periods. Credit, 4.
1:00-1:50 Tu. Th.; 1:00-3:50 W. F. or 2:00-4:50 Tu. Th.

Mr. BARTLETT, Mr. DEARDEN.

Prerequisite, Zoology 1.

72. (II) VERTEBRATE EMBRYOLOGY.—Lectures and laboratory work dealing with the development of representative animals, special emphasis being placed on the amphibian, bird and mammal.

2 class hours; 2 3-hour laboratory periods. Credit, 4.
1:00-1:50 Tu. Th.; 1:00-3:50 M. W. or 2:00-4:50 Tu. Th.

Mr. WOODSIDE, Mr. RAUCH.

Prerequisite, Zoology 71.

73. (I) GENERAL CYTOLOGY (1955-56).—A consideration of the morphological features of cells in relation to their function. Lectures, seminar reports and laboratory work will deal with cytoplasmic structure and inclusions and nuclear phenomena. Given in alternate years.

2 class hours; 1 3-hour laboratory period. Credit, 3.
Mr. ROLLASON.

Prerequisites, Zoology 50, 51.

74. (II) LIMNOLOGY (1953-54).—The study of inland waters, emphasizing the geological, physical, chemical and biological aspects of this problem. Standard methods for

making physical and chemical collections, tests and measurements are used by students on the numerous field trips. Biological material collected in the field is studied in the laboratory. Given in alternate years.

2 class hours; 2 3-hour laboratory periods.

Credit, 4.

Miss TRAVER

in cooperation with the departments of Botany, Entomology, Geology, Public Health, and Zoology.

Prerequisites, Botany 1; Zoology 1; Chemistry 1, 2; and permission to register. Strongly recommended: Botany 25, 26; Entomology 26; Zoology 25; Geology 27, 28; Chemistry 29, 30.

80. (II) ORNITHOLOGY.—An introduction to the study of ornithology which aims to serve as a basis for further technical study or for the development of a life-time hobby. Lectures are of a general nature covering as many branches of ornithological knowledge as possible. Laboratory work includes field identification and the anatomy of the pigeon.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

8:00-8:50 Th.; 3:00-4:50 M. F.

Mr. BARTLETT.

Prerequisite, Zoology 1.

81. (I) VERTEBRATE ZOOLOGY.—An introduction to the vertebrates, their classification and ecology, with particular emphasis on the fishes. Field trips for the study of local fauna will be included as a part of the laboratory exercises. Course limited to eighteen students.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

9:00-9:50 W.; 1:00-2:50 Tu. Th.

Mr. ANDREWS, Mr. BARTLETT.

Prerequisite, Zoology 1.

82. (II) MAMMALOGY (1954-55).—The paleontology, taxonomy, speciation, natural history, range and distribution of the class Mammalia. Primary emphasis will be placed upon the study of local fauna, including at least one week-end collecting trip as part of the laboratory exercises. Course limited to fifteen students. Given in alternate years.

2 class hours; 1 2-hour laboratory period.

Credit, 3.

Mr. DEARDEN.

Prerequisites, Zoology 1 and permission of instructor.

83. (I) GENERAL CELLULAR PHYSIOLOGY.—The properties and processes common to all organisms, including protoplasmic organization, permeability, metabolism, movement, bioelectricity, and reproduction.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. SWENSON.

Prerequisites, one year biology; organic chemistry.

84. (II) COMPARATIVE PHYSIOLOGY.—A course designed to familiarize students with physiological principles and adaptations to the environment of animals throughout the invertebrate and vertebrate phyla. In the laboratory the experimental method will be developed involving general procedures and individual problems.

3 class hours; 1 3-hour laboratory period.

Credit, 4.

Mr. ROBERTS.

Prerequisites, Zoology 1, 35.

85. (I) CLASSES OF ARTHROPODS OTHER THAN INSECTS.—Arthropods are studied from the phylogenetic standpoint, with special reference to their relationship to the origin and evolution of insects.

1 class hour; 2 2-hour laboratory periods.

Credit, 3.

12:00-12:50 W.; 1:00-2:50 W. F.

Mr. HANSON.

86. (II) FISHERY BIOLOGY.—Theory in the practice of regulating freshwater fisheries; the physical and biological conditions of the environment and their influence on fish populations.

2 class hours; 1 2-hour laboratory period.

9:00-9:50 Tu. Th.; laboratory hours by arrangements.

Mr. ANDREWS.

Prerequisite, Zoology 81 and permission of instructor.

87. (I) ENDOCRINOLOGY.—Emphasis will be directed toward the importance of the endocrines in their control over normal functions (growth, metabolism, reproduction, etc.), in a variety of animals.

2 class hours; 1 3-hour laboratory period.

Credit, 3.

Mr. SNEDECOR.

Prerequisite, Zoology 1.

91. (I) 92. (II) SPECIAL PROBLEMS IN ZOOLOGY.—Qualified graduate students and seniors who have met departmental requirements for specialization in the field of zoology may arrange for work on a special problem in zoology.

Credit, 1-3.

THE DEPARTMENT.

Invertebrate Zoology, Marine Biological Laboratory,
Woods Hole, Massachusetts. Credit, 3.

Invertebrate Embryology, Marine Biological Laboratory,
Woods Hole, Massachusetts. Credit, 3.

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of Pomology, Emeritus.*
- EDNA LUCY SKINNER, B.S., M.A. (Columbia University), M.ED.
(Michigan State Normal College), *Dean of the School of
Home Economics, Emeritus.*
- WILLIAM GOULD VINAL, B.S., M.A. (Harvard University), PH.D.
(Brown University), *Professor of Nature Education,
Emeritus.*
- WINTHROP SELDEN WELLES, B.S. (University of Illinois), M.ED.
(Harvard University), *Professor of Education, Emeritus.*
- BASIL BOISE WOOD, A.B. (Brown University), *Librarian, Emer-
itus.*

FACULTY OF RESIDENT INSTRUCTION

January, 1954

RALPH ALBERT VAN METER, B.S. (Ohio State University), M.S.
(University of Massachusetts), PH.D. (Cornell University), LL.D. (Amherst College), *President*. South College

JEAN PAUL MATHER, B.S.C., M.B.A. (University of Denver),
M.A. (Princeton University), *Provost*. South College

HERSCHEL GEORGE ABBOTT, B.S. (University of Maine), M.F.
(Harvard University), *Instructor in Forestry*.

Conservation Building

DORIS ELIZABETH ABRAMSON, B.A. (University of Massachusetts), M.A. (Smith College), *Instructor in Speech*.

Stockbridge Hall

GEORGE WILLIAM ALDERMAN, B.A. (Williams College), *Professor of Physics*.

Hasbrouck Laboratory

CHARLES PAUL ALEXANDER, B.S., PH.D. (Cornell University),
Professor of Entomology and Head of Department.

Fernald Hall

ELIOT DINSMORE ALLEN, B.A. (Wesleyan University), A.M.
(Harvard University), M.A., PH.D. (Princeton University),
Assistant Professor of English.

Chapel

LUTHER ALFRED ALLEN, A.B. (Williams College), M.A. (State
University of Iowa), *Instructor in Government*.

North College

STEPHEN IVES ALLEN, A.B. (Amherst College), A.M. (Harvard
University), *Instructor in Mathematics*.

Mathematics Building

DORIC ALVIANI, MUS.B., ED.M. (Boston University), *Professor
of Music*.

Memorial Hall

ALLEN EMIL ANDERSEN, A.B., M.A. (University of Nebraska),
PH.D. (Harvard University), *Professor of Mathematics
and Head of Department*.

Mathematics Building

EARL JAY ANDERSON, B.S. IN C.E. (Iowa State College), M.S. IN
S.E. (Massachusetts Institute of Technology), *Associate
Professor of Civil Engineering*.

Stockbridge Hall

JAMES FRANKLIN ANDERSON, B.S., M.S. (West Virginia University), *Instructor in Pomology*.

THOMAS JOSEPH ANDREWS, B.S. (University of Massachusetts),
A.M. (Williams College), *Assistant Professor of Zoology*.

Fernald Hall

MILTON PAUL BALDAUF, B.S. (Michigan State College), M.S.
(University of Massachusetts), *Instructor in Food Tech-
nology*.

Chenoweth Laboratory

¹ On leave of absence.

- ¹LORIN EARL BALL, B.S. (University of Massachusetts), *Assistant Professor of Physical Education.*
- WALTER MILLER BANFIELD, B.S. (Rutgers University), PH.D. (University of Wisconsin), *Assistant Professor of Botany.*
Clark Hall
- LUTHER BANTA, B.S. (Cornell University), *Assistant Professor of Poultry Husbandry.*
Stockbridge Hall
- JOHN P. BARRETT, Lieutenant Colonel, USAF., *Assistant Professor of Air Science and Tactics.*
Drill Hall
- ROLLIN HAYES BARRETT, B.S. (University of Connecticut), M.S. (Cornell University), *Professor of Farm Management.*
Stockbridge Hall
- LEON OSER BARRON, B.A. (University of Massachusetts), M.A. (University of Minnesota), *Instructor in English.*
Chapel
- LAWRENCE MATTHEWS BARTLETT, B.S., M.S. (University of Massachusetts), PH.D. (Cornell University), *Associate Professor of Zoology.*
Fernald Hall
- MAURICE EDWARD BATES, B.S.E. (M.E.) (University of Michigan), S.M. (Massachusetts Institute of Technology), PH.D. (University of Michigan), *Professor of Mechanical Engineering and Head of Department.*
Gunness Laboratory
- THEODORE LOUIS BATKE, B.A.SC., M.A.SC., PH.D. (University of Toronto), *Instructor in Chemical Engineering.*
Engineering Annex
- TORVALD ARTHUR BERTINUSON, B.S., M.S. (University of Denver), *Instructor in Agronomy.*
Stockbridge Hall
- ROBERT FREDERICK BIEHLER, B.A. (Syracuse University), M.A., PH.D. (University of Minnesota), *Instructor in Psychology.*
Liberal Arts Annex
- LYLE LINCOLN BLUNDELL, B.S. (Iowa State College), *Professor of Horticulture.*
Wilder Hall
- REGINA BOUIN, B.S. (Tufts College), *Instructor in Physical Education for Women.*
Drill Hall
- HAROLD DANFORTH BOUTELLE, B.S., C.E. (Worcester Polytechnic Institute), *Associate Professor of Mathematics.*
Mathematics Building
- LAWRENCE ELLIOTT BRIGGS, B.S., M.S. (University of Massachusetts), *Associate Professor of Physical Education.*
Physical Education Building
- MILDRED BRIGGS, A.B. (DePauw University), M.S. (Iowa State College), *Associate Professor of Home Economics.*
Edna Skinner Hall

¹ On leave of absence.

ROBERT RODERICK BROWN, B.S. (University of Texas), S. M. (Massachusetts Institute of Technology), *Professor of Electrical Engineering and Head of Department.*

Engineering Wing

KENNETH LLOYD BULLIS, D.V.M. (Iowa State College), M.S. (University of Massachusetts), *Professor of Veterinary Science and Head of Department.*

Paige Laboratory

JAMES WILLIAM BURKE, B.S. (University of Massachusetts), *Secretary of the University.*

South College

BERNARD PHILIP BUSSEL, B.S. (University of Massachusetts), M.A. (Columbia University), *Instructor in Mathematics.*

Mathematics Building

HALL GERALD BUZZELL, A.B. (Dartmouth College), M.S. (University of Massachusetts), *Instructor in Mathematics.*

Mathematics Building

FRED VIRGIL CAHILL, JR., B.A., M.A. (University of Nebraska), PH.D. (Yale University), *Professor of Government.*

North College

THEODORE CUYLER CALDWELL, B.A. (College of Wooster), M.A. (Harvard University), PH.D. (Yale University), *Professor of History.*

Chapel

JAMES WILLIAM CALLAHAN, B.S., M.S. (University of Massachusetts), *Instructor in Agricultural Economics.*

Stockbridge Hall

FRANCES EVANS CAMP, B.S. (University of Wisconsin), M.S. (Wellesley College), *Instructor of Physical Education for Women.*

Drill Hall

GEORGE WESLEY CANNON, B.A. (Dakota Wesleyan University), M.S., PH.D. (University of Illinois), *Associate Professor of Chemistry.*

Goessmann Laboratory

HAROLD WHITING CARY, A.B. (Williams College), A.M. (Harvard University), PH.D. (Yale University), *Professor of History and Head of Department.*

Chapel

KENNETH DELBERT CASHIN, B.S. IN CH.E., M.S. IN CH.E. (Worcester Polytechnic Institute), *Assistant Professor of Chemical Engineering.*

Engineering Annex

GILBERT CESTRE, Licence es Lettres, Diploma D'Etudes Supérieures, (University de Dijon), *Instructor in French.*

Liberal Arts Annex

JAMES WARREN CHADWICK, JR., B.S. (University of Massachusetts), *Instructor in Animal Husbandry.*

Stockbridge Hall

HARRY JOHN CHRISTOFFERS, B.S., M.S. (University of Washington), *Instructor in Chemistry.*

Goessmann Laboratory

DAVID RIDGLEY CLARK, B.A. (Wesleyan University), M.A. (Yale University), *Instructor in English.*

Chapel

- KATHERINE ALLEN CLARKE, A.B. (Goucher College), M.A. (Middlebury College), *Docteur de l'University de Grenoble, Assistant Professor of French*. Liberal Arts Annex
- WILLIAM GEORGE COLBY, B.S.A. (University of Illinois), M.S., PH.D. (Rutgers University), *Professor of Agronomy and Head of Department*. Stockbridge Hall
- ALTON BRIGHAM COLE, B.S. (University of Massachusetts), M.F. (Yale University), *1st Lieutenant, USAF, Assistant Professor of Air Science and Tactics*. Drill Hall
- DAN STEAD COLLINS, B.S. (University of Pennsylvania), M.A. (University of North Carolina), *Instructor in English*. Chapel
- RICHARD MOWRY COLWELL, B.S., M.S. (University of Rhode Island), PH.D. (University of Massachusetts), *Associate Professor of Accounting*. North College
- WALTER E. CONRAD, B.S., M.S. (Wayne University), PH.D. (University of Kansas), *Instructor in Chemistry*. Goessmann Laboratory
- JOSEPH CONTINO, B.MUS. (Oberlin College), M.A. (Columbia University), *Instructor in Music*. Memorial Hall
- MRS. GLADYS MAE COOK, B.S. (Battle Creek College), M.S. (University of Massachusetts), *Assistant Professor of Home Economics*. Edna Skinner Hall
- THOMAS ALBERT COOKINGHAM, B.S. (Cornell University), Captain, Armor, U.S.A., *Assistant Professor of Military Science and Tactics*. Drill Hall
- ARMAND J. COSTA, B.A. (American International College), *Instructor in Mechanical Engineering*. Engineering Shop
- BENJAMIN CHARLES CROOKER, JR., B.S. (University of Massachusetts), *Instructor in Physics*. Hasbrouck Laboratory
- THOMAS ALOYSIUS CULBERTSON, B.S. (University of Massachusetts), *Assistant Professor of Food Technology*. Chenoweth Laboratory
- HELEN FRANCES CULLEN, A.B. (Radcliffe College), M.A., PH.D. (University of Michigan), *Assistant Professor of Mathematics*. Mathematics Building
- ROBERT THOMAS CURRAN, B.S. IN BUS.AD. (College of the Holy Cross), *Assistant Professor of Physical Education*. Physical Education Building
- REYNOLD BERNARD CZARNECKI, B.S. (Pennsylvania State College), M.S., PH.D. (University of Illinois), *Assistant Professor of Bacteriology*. Marshall Hall Annex
- ALICE JEANETTE DAVEY, B.S. (University of Maryland), M.S. (Cornell University), *Instructor in Home Economics*. Edna Skinner Hall

DOROTHY DAVIS, B.S. (Syracuse University), M.A. (Columbia University), *Assistant Professor of Home Economics.*

Edna Skinner Hall

EDWARD LYON DAVIS, B.A. (Harvard University), M.S. (University of Massachusetts), *Instructor in Botany.*

Clark Hall

WILLIAM ALLEN DAVIS, B.A. (Colgate University), M.A. (Harvard University), *Assistant Professor of History.*

Chapel

LYLE CONWAY DEARDEN, B.A., M.A. (University of Utah), *Instructor in Zoology.*

LLEWELLYN LIGHT DERBY, B.S. (Springfield College), M.S. (University of Massachusetts), *Associate Professor of Physical Education.*

Physical Education Building

LAWRENCE SUMNER DICKINSON, B.S., M.S. (University of Massachusetts), *Associate Professor of Agrostology.*

Stockbridge Hall

JOHN HARLAND DITTFACH, B.M.E., M.S. (University of Minnesota), *Associate Professor of Mechanical Engineering.*

Gunness Laboratory

EDWIN DOUGLAS DRIVER, A.B. (Temple University), M.A. (University of Pennsylvania), *Instructor in Sociology.*

Draper Hall

MRS. MARRON SHAW DUBOIS, B.A. (St. Lawrence University), *Instructor in English.*

Chapel

CHARLES WARREN DUNHAM, B.S. (University of Massachusetts), M.S. (University of Wisconsin), *Instructor in Floriculture.*

FRED CHARLES ELLERT, B.S. (University of Massachusetts), M.A. (Amherst College), *Professor of German and Acting Head of Department.*

Liberal Arts Annex

J. MURRAY ELLIOT, B.S. (McGill University), *Assistant Professor of Animal Husbandry.*

Stockbridge Hall

EDWARD DONALD EMERSON, B.S. IN M.E. (Harvard University), M.M.E. (University of Delaware), *Assistant Professor of Mechanical Engineering.*

SEYMOUR EPSTEIN, B.A. (Brooklyn College), M.A., PH.D. (University of Wisconsin), *Assistant Professor of Psychology.*

Liberal Arts Annex

DWIGHT EDMUND ERLICK, A.B. (Colby College), M.A., PH.D. (Columbia University), *Instructor in Psychology.*

Liberal Arts Annex

JOHN NELSON EVERSON, B.S., M.S. (University of Massachusetts), *Assistant Professor of Agronomy.*

Stockbridge Hall

¹ On leave of absence.

- WILLIAM BENFORD FARRINGTON, B.S. IN C.E., M.S. (Cornell University), PH.D. (Massachusetts Institute of Technology), *Instructor in Geology*. Fernald Hall
- ¹ROBERT SIMION FELDMAN, B.S., M.S., PH.D. (University of Michigan), *Associate Professor of Psychology*. Liberal Arts Annex
- CARL RAYMOND FELLERS, A.B. (Cornell University), M.S., PH.D. (Rutgers University), *Professor of Food Technology and Head of Department*. Chenoweth Laboratory
- TSUAN HUA FENG, B.S. IN C.E. (National Pei-Yang University), M.S., PH.D. (University of Wisconsin), *Assistant Professor of Civil Engineering*. Gunness Laboratory
- JAMES M. FERRIGNO, A.B., A.M., PH. D. (Boston University), *Associate Professor of Romance Languages*. Liberal Arts Annex
- RICHARD WILLIAM FESSENDEN, B.S., M.S. (University of Massachusetts), PH.D. (Columbia University), *Professor of Inorganic Chemistry*. Goessmann Laboratory
- ²GORDON FIELD, B.S., M.S. (University of Massachusetts), *Instructor in Entomology*.
- MRS. HELEN LONG FIELD, A.B. (Ohio Wesleyan University), M.A. (Temple University), *Instructor in Psychology*. Liberal Arts Annex
- ALMON SUTPHEN FISH, JR., A.B. (Bates College), M.S. (Kansas State College), *Instructor in Pomology*. French Hall
- ROY MARSHALL FISHER, A.B. (Clark University), *Assistant Professor of Physics*. Hasbrouck Laboratory
- RICHARD CAROL FOLEY, B.S., M.S. (University of Massachusetts), PH.D. (Rutgers University), *Professor of Animal Husbandry*. Stockbridge Hall
- EDITH COLBURN FORBES, B.S. IN ED. (Framingham State Teachers College), M.ED. (Boston University), *Instructor in Home Economics*. Edna Skinner Hall
- CHARLES FREDERIC FRAKER, A.B. (Colorado College), A.M., PH.D. (Harvard University), *Professor of Romance Languages and Head of Department*. Liberal Arts Annex
- RALPH LYLE FRANCE, B.S. (University of Delaware), M.S. (University of Massachusetts), *Professor of Bacteriology and Head of Department*. Marshall Hall Annex
- ARTHUR PERKINS FRENCH, B.S. (Ohio State University), M.S. (University of Massachusetts), PH.D. (University of Minnesota), *Professor of Pomology and Plant Breeding and Head of Department of Pomology*. French Hall

¹ On leave of absence.

² On leave of absence for military service.

- PAUL ADELARD GAGNON, B.A. (University of Massachusetts),
M.A. (Harvard University), C.E.P. (Universite de Paris),
Instructor in History. Chapel
- PHILIP LYLE GAMBLE, B.S., M.A. (Wesleyan University), PH.D.
(Cornell University), *Professor of Economics and Head
of Department.*
- ROBERT VERRILL GANLEY, B.S. (University of Massachusetts),
M.F. (Duke University), *Instructor in Forestry.*
Conservation Building
- MARY ELLEN MONICA GARVEY, B.S. (University of Massachu-
setts), *Associate Professor of Bacteriology.*
Marshall Hall Annex
- GEORGE WOODROW GAUMOND, B.S. (University of Massachu-
setts), Captain, USAF, *Assistant Professor of Air Science
and Tactics.* Drill Hall
- ARCHIE PETER GAUTHIER, B.S. (Louisiana State University),
Lieutenant Colonel Armor, USA., *Assistant Professor of
Military Science and Tactics.* Drill Hall
- RICHARD McIVER GILLIS, B.B.A. (Tulane University), M.B.A.
(University of Pennsylvania), *Instructor in Business
Administration.* North College
- CHESTER STEPHEN GLADCHUK, B.S.ED. (Boston College), *Assis-
tant Football Coach.* Physical Education Building
- HARRY NEWTON GLICK, A.B. (Bridgewater College), A.M.
(Northwestern University), PH.D. (University of Illinois),
Professor of Philosophy and Head of Department.
North College
- STOWELL COOLIDGE GODING, A.B. (Dartmouth College), A.M.
(Harvard University), PH.D. (University of Wisconsin),
Professor of French. Liberal Arts Annex
- MAXWELL HENRY GOLDBERG, B.S. (University of Massachu-
setts), M.A., PH.D. (Yale University), *Professor of English.*
Chapel
- ULRICH KARL GOLDSMITH, B.A., M.A. (University of Toronto),
PH.D. (University of California), *Associate Professor of
German.* Liberal Arts Annex
- LEWIS CHARLES GOLDSTEIN, B.S., M.S. (University of Rich-
mond), PH.D. (University of Virginia), *Instructor in
Zoology.* Fernald Hall
- GEORGE GOODWIN, JR., B.A. (Williams College), M.A. (Harvard
University), *Assistant Professor of Government.*
North College
- ALBERT EDWARD GOSS, B.A., M.A., PH.D. (State University of
Iowa), *Associate Professor of Psychology.*
Liberal Arts Annex

1 On leave of absence.

- JACK ERWIN GRAPENTINE, B.A. (Mount Union College), Major,
 USAF, *Assistant Professor of Air Science and Tactics.*
 Drill Hall
- SUMNER MELVIN GREENFIELD, A.B. (Boston College), A.M.
 (Boston University and Harvard University), *Instructor*
in Romance Languages. Liberal Arts Annex
- THOMAS AUGUSTUS GROW, B.S. (University of Connecticut),
Assistant Professor of Civil Engineering.
 Engineering Wing
- HERBERT WILLIAM HAAS, B.S. IN C.E. (University of Wisconsin),
Lecturer in Public Health. Marshall Hall Annex
- NATHAN STRONG HALE, B.S. (University of Connecticut), M.S.
 (University of Minnesota), *Associate Professor of Animal*
Husbandry. Stockbridge Hall
- WILLIAM HALLER, JR., A.B. (Amherst College), M.A., PH.D.
 (Columbia University), *Assistant Professor of Economics.*
 North College
- EDWARD HALPERN, B.S., M.A. (Columbia University), *Instructor*
in Mathematics.
- TOM SHERMAN HAMILTON, JR., B.F.A. IN LAND. ARCH. (University
 of Illinois), *Instructor in Landscape Architecture.*
 Wilder Hall
- ROSS ELDON HAMLIN, B.S. (Purdue University), Captain,
 USAF, *Assistant Professor of Air Science and Tactics.*
 Drill Hall
- DENZEL J. HANKINSON, B.S. (Michigan State College), M.S.
 (University of Connecticut), PH.D. (Pennsylvania State
 College), *Professor of Dairy Industry and Head of Department.*
 Flint Laboratory
- JOHN FRANCIS HANSON, B.S., M.S., PH.D. (University of Massachusetts),
Associate Professor of Insect Morphology.
 Fernald Hall
- HAROLD ERNEST HARDY, A.B. (Pomona College), PH.D. (University
 of Minnesota), *Professor of Marketing.*
 North College
- RICHARD HAVEN, B.A. (Harvard University), M.A. (Princeton
 University), *Instructor in English.* Chapel
- SARAH LOUISE HAWES, B.S. (Northern Michigan College of
 Education), M.S. (Cornell University), *Instructor in*
Home Economics. Edna Skinner Hall
- WILLIAM KARR HEFNER, B.A. (Antioch College), C.P.A., *Assistant*
Professor of Accounting. North College
- VERNON PARKER HELMING, B.A. (Carleton College), PH.D.
 (Yale University), *Professor of English.* Chapel
- KARL NEWCOMB HENDRIKSON, B.S., M.S. (University of Maine),
Associate Professor of Civil Engineering.
 Gunness Laboratory

¹ On leave of absence.

- MRS. MARCIA GRAHAM HIBBARD, B.S. (Russell Sage College),
M.S. (Syracuse University), *Instructor in Physical Edu-
cation for Women.* Drill Hall
- MRS. FLORIANA TARANTINO HOGAN, B.S., A.M. (Boston Univer-
sity), *Instructor in English.* Chapel
- ROBERT POWELL HOLDSWORTH, B.S. (Michigan State College),
M.F. (Yale University), *Professor of Forestry and Head
of Department.* Conservation Building
- BRONISLAW MARK HONIGBERG, A.B., M.A., PH.D. (University of
California), *Assistant Professor of Zoology.* Fernald Hall
- LEONTA GERTRUDE HERRIGAN, B.S. (University of Massachu-
setts), M.A. (Smith College), *Assistant Professor of
English.* Chapel
- MARSHALL CHAPMAN HOWARD, A.B. (Princeton University),
PH.D. (Cornell University), *Assistant Professor of Eco-
nomics.* North College
- ELISABETH VICKERY HUBBARD, B.S. (University of Wisconsin),
M.A. (University of Chicago), *Instructor in Physical Edu-
cation for Women.* Drill Hall
- SAMUEL CHURCH HUBBARD, *Assistant Professor of Floriculture.*
French Hall
- ANGELO IANTOSCA, S.B. (Massachusetts Institute of Tech-
nology), *Visiting Lecturer in Public Health.* Marshall Hall Annex
- FRED PAINTER JEFFREY, B.S. (Pennsylvania State College),
M.S. (University of Massachusetts), *Professor of Poultry
Husbandry and Head of Department.* Stockbridge Hall
- WARREN IRVING JOHANSSON, B.S., M.S. (University of Massa-
chusetts), *Instructor in Geology and Mineralogy.* Fernald Hall
- ROBERT BROWN JOHNSON, A.B. (Ohio University), M.A., PH.D.
(University of Wisconsin), *Assistant Professor of Ro-
mance Languages.* Liberal Arts Annex
- WILLIAM BRADFORD JOHNSON, B.S. (Pennsylvania State Col-
lege), M.S. (University of Massachusetts), *Instructor in
Olericulture.* French Hall
- SIDNEY KAPLAN, B.A. (College of the City of New York), M.A.
(Boston University), *Assistant Professor of English.* Chapel
- JOHN HOPKINS KARLSON, B.S. IN E.E. (University of Wisconsin),
M.S. IN E.E. (Northwestern University), *Assistant Pro-
fessor of Electrical Engineering.* Guinness Laboratory
- SIDNEY WILLIAM KAUFFMAN, B.S., M.ED. (Springfield College),
*Professor of Physical Education and Head of Department
of Physical Education for men.* Physical Education Building

- CAROLYN HELEN KENDROW, B.S. (University of Massachusetts),
Instructor in Chemistry. Gossmann Laboratory
- CARL ANTON KEYSER, B.S. (Carnegie Institute of Technology),
B.S., M.S. (Worcester Polytechnic Institute), *Associate*
Professor of Metallurgy. Engineering Wing
- MILO KIMBALL, B.S. (Ohio Northern University), B.B.A., M.B.A.
(Boston University), *Dean of the School of Business*
Administration. North College
- CLARENCE WENDELL KING, B.A., M.A., PH.D. (Yale University),
Assistant Professor of Sociology. Draper Hall
- GORDON STEPHENSON KING, B.S. (Michigan State College),
Assistant Professor of Arboriculture. Wilder Hall
- ROBERT McCUNE KINGDON, B.A. (Oberlin College), M.A.
(Columbia University), *Instructor in History.* Chapel
- DAVID WARREN KNUDSEN, B.S. IN E.E. (University of Maine),
Instructor in Electrical Engineering. Engineering Wing
- STANLEY KOEHLER, A.B., A.M. (Princeton University), M.A.
(Harvard University), PH.D. (Princeton University),
Assistant Professor of English. Chapel
- JAY HENRY KORSON, B.S. (Villanova College), M.A., PH.D. (Yale
University), *Professor of Sociology and Head of Depart-*
ment. Draper Hall
- STEPHEN RAYMOND KOSAKOWSKI, *Instructor in Physical Edu-*
cation. Physical Education Building
- THEODORE THOMAS KOZLOWSKI, B.S. (Syracuse University),
M.A., PH.D. (Duke University), *Professor of Botany and*
Head of Department. Clark Hall
- HENRY KRATZ, JR., B.A. (New York State College for Teachers),
M.A., PH.D. (Ohio State University), *Instructor in German.*
Liberal Arts Annex
- WALTER SIDELINGER LAKE, B.S., M.ED. (Fitchburg State Teach-
ers College), *Assistant Professor of Mechanical Engi-*
neering.
- ROBERT PHILIPS LANE, A.B. (Columbia University), M.A. (Har-
vard University), *Assistant Professor of English* Chapel
- JOSEPH WALTON LANGFORD, JR., B.S. (University of New
Hampshire), S.M. (Massachusetts Institute of Techno-
logy), *Associate Professor of Electrical Engineering.*
Engineering Wing
- MARSHALL OLIN LANPHEAR, B.S., M.S. (University of Massa-
chusetts), *Registrar.* South College
- EDWARD PETER LARKIN, B.S., M.S. (University of Massachu-
setts), *Instructor in Public Health.*
Marshall Hall Annex
- HENRY ARTHUR LEA, B.S. IN ED., M.A. (University of Pennsyl-
vania), *Instructor in German.* Liberal Arts Annex

WALTER WILFRED LEE, M.B., M.D. (Toronto University), M.P.H.
(Harvard University), *Lecturer in Public Health.*

Marshall Hall Annex

ROBERT WARD LENTILHON, B.S. (University of Rhode Island),
M.B.A. (Boston University), *Instructor in Business Ad-
ministration.*

North College

ARTHUR SIDNEY LEVINE, B.S., M.S., PH. D. (University of Massa-
chusetts), *Associate Professor of Food Technology.*

Chenoweth Laboratory

MITCHELL A. LIGHT, A.B., M.A. (University of Missouri), PH.D.
(Rutgers University), *Assistant Professor of Geology and
Mineralogy.*

Fernald Hall

HERBERT ERNEST LINDNER, B.S. IN M.E. (University of Massa-
chusetts), *Instructor in Mechanical Engineering.*

Gunness Laboratory

HARRY GOTTFRED LINDQUIST, B.S. (University of Massachu-
setts), M.S. (University of Maryland), *Assistant Pro-
fessor of Dairy Industry.*

Flint Laboratory

ADRIAN HERVE LINDSEY, B.S. (University of Illinois), M.S.,
PH.D. (Iowa State College), *Professor of Agricultural
Economics and Head of Department of Agricultural
Economics and Farm Management.*

Stockbridge Hall

EDGAR ERNEST LINDSEY, B.S. IN CH.E. (Georgia School of Tech-
nology), D.ENG. (Yale University), *Professor of Chemical
Engineering.*

Engineering Annex

LOWELL EDWIN LINGO, B.E., M.E. (Yale University), *Assistant
Professor of Electrical Engineering.*

Gunness Laboratory

HENRY NELSON LITTLE, B.S. (Cornell University), M.S., PH.D.
(University of Wisconsin), *Associate Professor of Chem-
istry.*

Goessmann Laboratory

ROBERT BLAIR LIVINGSTON, A.B. (Colorado College), M.A., PH.D.
(Duke University), *Professor of Botany.*

Clark Hall

JOHN BAILEY LONGSTAFF, B.S. (United States Naval Academy),
M.S. (Pennsylvania State College), *Associate Professor
of Mechanical Engineering*

Gunness Laboratory

EARL EASTMAN LORDEN, B.S., M.ED. (University of New Hamp-
shire), *Professor of Physical Education.*

Physical Education Building

JAMES BUREN LUDTKE, B.A., M.A., PH.D. (State University of
Iowa), *Assistant Professor of Business Finance.*

North College

DANIEL JUSTIN MCCARTHY, B.S.E., ED.M. (Bridgewater State
Teachers College), *Assistant Professor of Education.*

Liberal Arts Annex

WILLIAM PRESTON MACCONNELL, B.S. (University of Massa-
chusetts), M.F. (Yale University), *Assistant Professor of
Forestry.*

Conservation Building

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M.S. (Pennsylvania State College), *Assistant Professor
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Heads of those departments functioning in the Experiment Station, although not listed here, are also recognized as members of the staff.

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January, 1954

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1953 - 1954

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* Alumni Representative.

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UNIVERSITY OF MASSACHUSETTS ENROLLMENT SEPTEMBER 1953

UNDERGRADUATE COLLEGE

Class	1954		1955		1956		1957		Total		
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Total
Liberal Arts	68	119	104	144	111	144	119	227	402	634	1036
Science	80	36	90	49	104	76	130	101	404	262	666
Agric. & Hort.	89	7	82	5	94	11	77	6	342	29	371
Engineering	57	0	91	0	192	2	269	8	609	10	619
Bus. Administration .	71	5	127	8	116	10	136	10	450	33	483
Home Economics ...	0	56	0	70	0	62	0	64	0	252	252
Physical Education ..	10	0	10	0	17	0	23	0	60	0	60
	375	223	504	276	634	305	754	416	2267	1220	3487
							Specials		16	15	31
									2283	1235	3518

GRADUATE SCHOOL

Men	Women	Total
269	41	310

STOCKBRIDGE SCHOOL

Class	1954	1955	Total
Men	91	162	253
Women	4	5	9
			262
			Special
			1
			263

SUMMER SCHOOL

Men	Women	Total
388	146	534

SUMMARY

Undergraduate College	3518
Graduate School	310
Stockbridge School	263
TOTAL ENROLLMENT	4091

Office of Publications
November, 1953

GIFTS AND BEQUESTS

For the information of those who may wish to make a gift or a bequest to this University, the following suggestion is made as to a suitable form which may be used.

There are a number of worth-while activities of the University which are handicapped by lack of funds and for which small endowments would make possible a greater measure of service to our students and to the Commonwealth. The religious work on the Campus is an example. This is now carried on in a very limited way by current private contributions. Further information concerning this and other activities in similar need will be gladly furnished by the President.

SUGGESTED FORM

"I give and bequeath to the Trustees of the University of Massachusetts, at Amherst, Massachusetts, the sum of dollars."

(1) (Unrestricted)

"To be used for the benefit of the University of Massachusetts in such manner as the Trustees thereof may direct."

or (2) (Permanent Fund: income unrestricted)

"to constitute an endowment fund to be known as the Fund, such fund to be kept invested by the Trustees of the University of Massachusetts and the income used for the benefit of the College in such manner as the Trustees thereof may direct."

or (3) (Specific Purposes)

"to be used for the following purposes,"

(Here specify in detail the purposes.)

REPORT OF PROGRESS

of the

University of Massachusetts

JANUARY, 1953 TO JANUARY, 1954



- for the Board of Trustees
 - for the Governor
 - for the Citizens of the Commonwealth
-

"Ninety Years of Service to Massachusetts"

February 16, 1954

The Honorable Joseph W. Bartlett
Chairman, Board of Trustees
The University of Massachusetts

Dear Mr. Bartlett:

I have the honor to present through you to the Board of Trustees, and to the Governor and Citizens of the Commonwealth a Report of Progress for the University of Massachusetts covering the year January 1, 1953 to January 1, 1954. In the absence of President Ralph A. Van Meter, I have prepared this report as Provost of the University.

Respectfully yours,

J. PAUL MATHER

Provost

VOLUME XLVI

APRIL 1954

NUMBER 3

Published six times a year by the University of Massachusetts: January, February, April (two), May, September. Entered at Post Office, Amherst, Mass., as second class matter.

The report of the President for the year ending January 1, 1954, is part of the 91st annual report of the University of Massachusetts, and as such is Part I of Public Document 31. (Section 8, Chapter 75, of the General Laws of Massachusetts.)

UNIVERSITY OF MASSACHUSETTS ENROLLMENT

SEPTEMBER, 1953

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Men	Women	Total
388	146	534

SUMMARY

Undergraduate College	3518
Graduate School	310
Stockbridge School	263
Total Enrollment	4091

(Office of Publications, November, 1953)

Report of Progress

1953

LATE in April, 1953, President Ralph A. Van Meter, serving his seventh year as President of the University of Massachusetts, suffered a shock and was hospitalized. His recovery and return to health have progressed steadily in recent months and at the time of writing this report he plans to return to the campus during the spring semester of 1954. During a trying period, when the President's vision and leadership have been missing, the cooperation, support, and loyal interest of the Board of Trustees, legislators and state officials, the staff, the student body, the alumni, and all friends of the University, have contributed immeasurably to the continued stability and progress of the entire program of instruction and research to which this state institution is dedicated.

IN the opening pages of President Van Meter's report of 1952, reference was made to increasing pressures of college age populations, now and in the future, upon college and university facilities in the Commonwealth and throughout the country. A striking sentence in these comments was "...that either college attendance must be increased by 50% by 1965 or college must be denied to thousands of able and ambitious boys and girls." The President further identified the relatively static long range position of private colleges, where future expansion of staff and facilities must necessarily be a function of endowment income. This static situation forces the dynamic impact of students, already born and coming up through elementary schools, upon tax-supported colleges and universities.

Future of Public Higher Education

The pressure of general population increase in the Commonwealth is comparable to similar pressures in other states. But the problem of the future of *public* higher education in Massa-

chusetts, which is a much larger and more significant consideration, is inherent in the present position and the future development of the University. For with the exception of the teachers colleges and technical schools, the University of Massachusetts is public higher education in the Commonwealth. A brief statistical reference will support this statement. Academic year before last, the latest year for which the U. S. Office of Education has complete data for all states, Massachusetts had a total undergraduate enrollment in degree granting institutions of 71,850 students. Of this number, 67,402 were enrolled in private colleges and universities and 4,448 in public institutions. In the same year, 3,879 Massachusetts high school graduates migrated to public institutions of higher learning in other states. More students migrated to public institutions than were enrolled in total at the University of Massachusetts, and 13,843 additional Massachusetts youngsters, educated at the taxpayers expense in our elementary and secondary schools, migrated to private institutions in other states.

While this "out migration" occurred, 26,619 students from out-of-state were admitted to private colleges and universities in Massachusetts or 40% of the total private enrollment.¹ The need for development of greater public educational facilities at the college level is apparent in these data. The need will increase in the future and the obligation of the state is to adequately "care for its own" greatest assets, youth and brains. The University of Massachusetts, a land grant university, is the Commonwealth exemplification of Senator Morrill's original philosophy in championing such institutions, "founded on the idea that a higher and broader education should be placed in every state within the reach of those whose destiny assigns them to, or who may have the courage to choose industrial vocations where the wealth of nations is produced; where advanced civilization unfolds its comforts, and where a much larger number of people need wider educational advantages, and impatiently await their possession. The design, . . . to open the door to a liberal education for this large class at a cheaper cost from being close at hand, and to tempt them by offering not only sound literary instructions, but something more applicable

¹ Source: U. S. Office of Education (Residence and Migration of College Students) 1952 Council of State Governments Report, pp. 175-183

to the productive employments of life.”

Meaning of the Enrollment Statistics

In this report the annual enrollment statistics are included first in order to emphasize at the outset the diversification and breath of opportunity available at Amherst. The seven major colleges, schools, and divisions represent the true meaning of a “universe” of education available in a great university. The total enrollment, 4,091 is three hundred students above last year’s total of 3,791 and the largest to date in the history of the University. This enrollment figure occurs in a year in which 6,673 freshmen applied for admission. Of these applicants, the top 1,170, qualified by testing and high school achievement, were admitted.

The distribution of undergraduate students by curriculum stands: 45% in Arts and Sciences; 17% in Agriculture; 15% in Engineering; 13% in Business Administration; and the balance in Home Economics and Physical Education.

Enrollment of veterans has increased by about 50 per cent over that for the academic year 1952-53. There are almost four times as many Korean veterans on campus as were enrolled last year. The total under the Korean bills, Public Law 550 and Public Law 894, numbers 267. Eighty students remain under World War II veterans’ benefits.

Beyond the cold statistics of enrollment lies the warm heart of the University community. In the schools, colleges, and divisions, in students activities ranging from sports to song, people work with people toward the common goal of enlightened and progressive citizenship.

The Liberal Arts Program

The College of Liberal Arts attracts a larger proportion of students year by year. Students sense that in terms of a life in contrast to a living, Liberal Arts have something unique to offer, and this feeling will grow and continue. While a concentration of coeds is obvious in the Arts program it is significant that forty per cent of the Liberal Arts majors are men. It is essential at a time when the general community is emphasizing

the need for the arts and humanities as positive social factors, that it be widely recognized that the University has a strong curriculum with an able and recognized staff in these fields. The independent liberal arts institutions do not stand alone, since the land grant universities have always placed a strong and increasing interest in developing the liberalizing studies.

The Science Program

The College of Sciences, sister unit to the College of Arts, continues to go forward in the tradition maintained steadily ever since early recognition of discoveries and fine instruction in science, when the school was a small agricultural college. Qualified seniors are being accepted by the best graduate schools and by medical and dental schools. Science students, at present, occupy a very favorable bargaining position in the industrial employment market. As a leavening agent for better teaching, many staff members are carrying on active research projects. Private and government grants amounting to some \$45,000 in the past two years have stimulated research activity that best represents the inquiring mind and open search for truth that keep a university alive and changing. Research changes the very atmosphere of instruction with the eternal question mark that brings the curious mind of youth alive.

As soon as it can be managed the employment of a full time Dean of Arts and Sciences will permit the organization of the existing College of Arts and the College of Sciences into a single College of Arts and Sciences. This natural amalgamation, already accomplished in most large universities, will provide a general college as a vehicle for the basic courses which prepare for specialization in other schools and divisions, as well as a major area for those who prefer to work toward the Bachelor of Arts or Bachelor of Science degrees.

Agriculture and Horticulture

The School of Agriculture and Horticulture includes resident instruction, experiment station research, extension work, and control investigation and research, that service an industry with a \$202,000,000 annual income in Massachusetts. Part of

the proposed University budget for 1954 recommends a Reorganization Plan which will, if accomplished, bring together at the departmental level the ideas, discoveries, and work of the four complementary service divisions.

Such a reorganization will provide better service for the industry and a better transfer of ideas developed and jobs done on the campus and throughout the state.

At the 1953 Commencement, the School of Agriculture and Horticulture graduated 74 students with the Bachelor's degree, 23 with the Master's degree, 7 with the Ph.D degree, and 81 with Stockbridge School diplomas. For the present school year, 371 undergraduates, 66 graduate students and 263 Stockbridge School students are enrolled. This enrollment in Agriculture places the University 16th among the 50 Land-Grant Colleges and 13th in terms of the percentage of the total student body enrolled in Agriculture.

An effective scholarship program within the School awarded \$17,700 to 131 worthy and meritorious students. Several potential donors are now considering additional grants for student aid.

Recognition and development of the instruction program in Agriculture have occurred simultaneously. A four-year food management course and a four-year fish technology course were initiated. An intensive photogrammetry course started in the Forestry Department was attended by a large number of employees of the State Conservation Department. During the past summer the Food Technology Department was chosen by the Mutual Security Agency for a two-week short course for 23 persons from 11 foreign countries.

Communication Is Extension Service Key

The Extension Service Program, celebrating its golden anniversary this year, is the community education branch of the School of Agriculture and Horticulture. Communication is a key word in the Extension Service. The television show "Down to Earth" on WBZ-TV started its third year December 3, 1953. This show has attracted nation-wide comment and 14,553

individual requests were received for materials mentioned on the 49 programs. One hundred seventy-five radio programs were broadcast 311 times on 8 radio stations covering the state. Four special programs were used on two national networks; 8,000 requests were received for information discussed on these programs. During the year over one million leaflets and bulletins were supplied on request to citizens of the Commonwealth.

The Experiment Station

The Instruction and Extension programs in Agriculture and Horticulture are based primarily on information obtained through research in the Experiment Stations. Outstanding results at the University have been reported in 86 journal articles, 16 bulletins, and 2 popular magazines. Work by a staff of 115 people, 65 of whom are in professional grades, was conducted at the central experiment station on campus, at Waltham Field Station and the Cranberry Station at East Wareham. Outstanding research may be briefly summarized as: a new method for evaluating thermal death time of bacteria for short time food processing; a new method for determining water contamination; a simplified spray vaccine for poultry against Newcastle Disease; a new method of cooling and freezing eviscerated poultry by brine immersion; two new varieties of improved yellow sweet corn; and a new herbicide for controlling weeds and nutgrass in asparagus fields.

The Control program tests feeds, fertilizers, seeds, dairy glassware and other materials as a service program for farmers, producers, and consumers. The control chemists and seed analysts have continued to expand and devise new methods for determining components of feeds, fertilizers, seeds, and other proprietary materials.

Business Administration Expands Rapidly

Enrollment in the School of Business Administration increased nearly 20 per cent over last year, not counting students from other divisions of the University electing business courses. As the youngest and most rapidly expanding professional school on campus, the School of Business Administration is providing

instruction for 25 per cent more students than it was two years ago, and students from other Schools electing one or more business courses has increased from about 60 in 1951 to over 100 today. General Management and Marketing majors predominate with growing numbers in the Accounting and Industrial Administration options. Growing pains are usually most evident in the newest members of the University family. Plans to move the School of Business to Draper Hall when it is remodelled will relieve current pressures and enable the School to balance student demands with space, staff, and equipment expansion in the near future. The School of Business at the University provides the current "trend laboratory" for training the broad-gauge specialists as well as the would-be executives that represent service to the industrial economy of the Commonwealth.

The Engineering School

This was the sixth year since the establishment of the School of Engineering in the University and marked a substantial increase in enrollment, the planning with the architect of the next unit of the engineering development, and the undertaking of the first major research project in the Engineering Research Institute.

We continue to attract good students and that is very important to the reputation of the Engineering School. About one-third of the freshmen boys admitted to the University are selecting engineering as a major and enrollment reached 619 in September 1953. This trend continues. Academic mortality substantially reduces their numbers although studies have indicated that our survival rate is similar to that at other good engineering schools. Fifty received B.S. degrees in a professional engineering field in June 1953. Of these, twenty took longer than eight semesters to complete their work and twenty were in the upper half of their University class. These graduates took positions with twenty-eight different companies or government agencies. Many "big industry" concerns sent recruiting representatives to the campus, and their interest in our students is a tribute to the fine record our former graduates have made.

The student chapter of the American Society of Civil Engineers received an honorable mention from the board of directors of the society. Student members of our chapters of A.S.C.E., A.S.M.E and A.I.E.E. participated in the annual New England student paper contests, winning a first place in the A.S.C.E. group and a fourth place in the A.S.M.E. group.

The Engineering staff were professionally active this past summer. One was in Greenland with a National Geographic Society project; one was in Europe visiting several universities for the U. S. Air Force; another served as consulting sanitary engineer; and another worked on an Office of Naval Research Project at the Alden Hydraulic Laboratory. Other assignments included: research on the staff at M.I.T.; television work in western Massachusetts, Bureau of Ships Naval research project; consultant on research work for Hessey-Eastern of Boston; work toward a doctorate at Renesselaer; and the five-week General Electric Company Professors' Conference in Schenectady and Cincinnati.

New Engineering Building Planned

The 1952 Legislature provided \$850,000 for the Main Engineering Building, and the staff, with the help of the architects, planned the laboratories and classrooms. Ground should be broken in the spring of 1954 and the building completed possibly by September 1955. This will provide seven additional laboratories, seven much needed classrooms, three conference rooms and three drafting rooms. Also included are studios for the University radio station. Continued development of the laboratories by staff members and technicians have improved the instructional program. A small sanitary engineering laboratory has been set up in the Engineering Annex.

Engineering education continues to analyze its own needs. Trends at present point to further emphasis on mathematics, basic science and the engineering sciences. Humanistic social courses will continue to demand about twenty per cent of the engineering student's time if not his interest. Graduate work will further develop as the economic factors attracting engineering graduates immediately into industry decrease.

Home Economics Has Cultural Approach

A broad program of general studies plus a cultural approach to subjects of special interest to homemakers and professional women continues to be the goal of the School of Home Economics. Recognizing that most young women need to be prepared for some years of service and remunerative employment as well as for homemaking, the curriculum offerings are planned to give each student a general education as well as specialization in a chosen field. The shortage of qualified candidates for college and secondary school teaching, for nutrition and dietetics, for extension and for research is currently serious. As increased demand and earlier marriages are the causes of this shortage in spite of maintenance of good enrollment—the only way to meet this demand is to make more girls aware of the opportunities in these fields.

Of the fifty two girls in the class of 1953, about one fourth are married, one third are teaching, three are doing graduate work and the rest are engaged in merchandizing, extension, dietetics, dormitory maintenance and a variety of other fields. The placement office had call for many more teachers and dietitians than we could supply.

Curriculum For Non-Majors

The increased non-major registration in various courses is a trend which may well be encouraged. Education for home and family living should be a part of every student's education regardless of his or her major interest, and the School of Home Economics stands ready to offer such service courses to non-majors as well as to majors. Boys find courses in Nutrition, foods and Family Life especially valuable. Adult education classes are also using the laboratory facilities at Skinner Hall and the staff are frequently called upon to address special groups.

The basic science requirements for students in applied fields such as Home Economics have been under review. Some progress is being made in motivating students to appreciate the application of the basic sciences in applied fields.

Affiliation with Merrill-Palmer School in Detroit permits us to send one or two students for one semester each year. This year a new affiliation has been established with the Nursery Training School in Boston where one or more students may take a semester of special work.

The Alpha Pi Chapter of the National Home Economics Honor Society, Omicron Nu, was established at the University late in 1952 and has elected members from the top twenty percent of the classes of 1953 and 1954. The 1954 students are assisting in the tutorial program for freshmen instigated by the Guidance Office.

Home Economics Extension is continuing to bring new knowledge and research to the families of the state. Four Workshops and eight training schools were held during the year by Specialists for Home Demonstration Agents and 4-H Women Agents to keep the agents posted on information in the fields of Family Finance, Nutrition, Child Development, Family Life, and Consumer Education. Consumer Education included Clothing, Home Furnishings, Food and Housekeeping Supplies.

A Developing Graduate School Program

Enrollment in the Graduate School continues to increase in spite of the fact that as a general rule, Graduate Schools throughout the country have shown a decline in the number of students during the past year. During the first semester of 1952-53, 254 students were enrolled whereas during the first semester of 1953-54, 310 were enrolled. At the 1953 Commencement, the following degrees were awarded: 12 Ph.D., 78 M.S., 11 M.A., 2 B.L.A., and 2 M.C.E. degrees.

During the past year two new departments were given the privilege of offering graduate work, Sociology for the Master of Arts degree and Business Administration for the degree, Master Business Administration. One department, Psychology, previously authorized to give a Master's degree has now been approved for the offering of the Ph.D.

Four Phases of Physical Education

The Division of Physical Education covers four major types of activity: (1) the required physical education curriculum for men and for women during the freshman and sophomore years; (2) the voluntary intramural sports program; (3) varsity inter-school athletics; and (4) the professional four year course for those who intend to make Physical Education a career. Continued improvement of the over-all offerings of the Division, constant evaluation of the varied programs, and revision to meet current trends in education are the objectives of the Division.

The Division of Physical Education is cognizant of the long felt need for and of the responsibility of the State University in establishing a School of Physical Education in the near future.

The current undergraduate major would afford the framework of such a School. The necessary indoor and outdoor areas could be improvised, and adequately serve for a limited interim period pending completed construction of additional physical facilities. There can be no substitute, improvisation or delay in establishing a professionally trained teaching staff in Physical Education. Additional staff is essential and urgently needed under the current divisional status. The University should take its proper position as one of the leading institutions in the area of teacher preparation in Physical Education. School status would establish an adequate teaching staff, lead to ultimate realization of urgently needed facilities, provide for academic prestige and strengthen placement opportunities for undergraduate and graduate majors.

Revitalized Library Service

Under the capable direction of the new librarian, the services and organization of Goodell Library have been completely revamped and vitalized during the past year. Some idea of the activity involved may be gained from the following tabular statistics:

Circulation Statistics—July 1952—June 1953

Total circulation	19,957
Largest circulation by classes:	
Literature	4,374
Social Sciences	2,661
History	1,612
Biography	1,300
Useful Arts	1,029
Fine Arts	997
Months having largest circulation:	
March	4,297
April	3,393
May	2,032
Number of days library was open July 1—June 30	310
Acquisition and Cataloging Statistics	
Total Books Catalogued July 1, 1952—June 30, 1953	10,786
Total Books Discarded July 1, 1952—June 30, 1953	293
Net Total	10,493
Fort Devens Books recatalogued	12,660
Replacements January 1, 1953—June 30, 1953	76
Total purchases July 1, 1952—June 30, 1953	4,354
Total gifts July 1, 1952—June 30, 1953	6,432
Total added	10,786
Total books in Library System	182,637

General over-all plans for a large Library addition have been discussed by Librarian and staff during the course of the year. Specific details as to floor areas and type of equipment must be deferred until joint planning action can begin under the cooperative guidance of staff and architects.

The continuing study of administrative and technical procedures with the aim to increase the effectiveness of the central library unit will be a constantly recurring process for many years, but long range improvement is largely contingent on expanded Library and staff facilities. The Library must necessarily play a role of ever increasing importance in the teaching program for the University.

Services to Students

Many people speak of state universities as huge, impersonal machines, little interested in the personal welfare and morale of the student body. This criticism is certainly unwarranted at the University of Massachusetts. Here a competent staff of Deans, Placement Officers, Health Officers, Guidance and Counselling experts and the entire faculty participate in specialized and general contacts and help programs for all students. Because many students at state institutions come from middle and lower income families they have to earn part of their way during the school year. During the past year 733 young men and women received help through part-time employment to an amount of \$103,662, or an average of \$134 per student employed.

At the beginning of the academic year 1953-54, some 112 members of the teaching staff were asked to serve as advisers to an average of 10 freshmen each. The students were assigned to instructors within the School or Division in which they had signified their intention to specialize. Advisement was not restricted to academic problems *per se*; freedom of scope has always been considered to be the most effective means of establishing rapport among the adviser, the student, and the services of the offices of the Dean of Men and Dean of Women.

Referrals of difficult situations have been made with considerable frequency to more professionally trained specialists; e.g., Student Health physicians, director of guidance, and his staff associates, consulting psychiatrist, deans of men and women and others.

Helping freshmen to "get the right start" is of vital importance as the first few months of college often set the pattern of attitudes and habits for a student's four years. This year, under the supervision of the Dean of Men and the Dean of Women, many upperclass students assisted in the Orientation of Freshmen. The Student Senate sponsored a Leaders Conference prior to the opening of college, and the four Honor Societies, Adelpia, Isogon, Scrolls, and Maroon Key, and the Women's Athletic Association conducted various excellent get-acquainted activities and assisted with University registra-

tion. Faculty, too, were generous with their time and efforts in making this the most effective orientation of new students we have had since the University was a much smaller college.

The Guidance Office

If voluntary use by students of a guidance service is any criterion of the success of that service, the Guidance Office, now entering its third year of continuous operation, has been successful. During 1953 more than 510 students have made individual contacts with the Guidance Office. This represents a two-thirds increase over the number of students who sought guidance aid during the 1951-52 academic year. The increase in student use of the Guidance Office is even more striking if the fall semester of 1952 is compared to the fall semester of 1953. The average number of new guidance contacts per week during the fall semester of 1953 is double that for a similar period in 1952.

Sources of referral to the Guidance Office have remained relatively constant. More than 85% of all students enter the office on their own initiative based only on informal recommendations of other students, 10% are referred by faculty advisers, and the remainder are strongly urged or required to come to the Guidance Office by members of the faculty or administration.

A Uniquely Strong Staff

NO institution devoted entirely to public service is ever any stronger than its staff. The University is uniquely strong in the people who do its work. Their devotion and self-sacrifice in line of duty is an inspiration to the public and student body they serve, and day to day what each man and woman gives is inspiration each to the other.

The year 1953 saw 58 new appointments to the instructional staff—47 Instructors, 9 Assistant Professors and 2 full Professors. Fred V. Cahill, Jr. was appointed as Professor of Government and Miss Mary A. Maher as Professor and Head of the newly formed Division of Nursing. Six new instructors,

three assistant professors, one associate professor and one full professor joined the ranks of professionals in the Experiment Station and Extension Service.

Promotions, in recognition of distinguished service, were given to two people appointed to Head of Department from Professor; to six Assistant Professors raised to Associate Professor; to seven Instructors appointed Assistant Professors; and to one Associate Professor now full Professor.

Thirty-two instructors, 13 assistant professors, 1 associate professor and 4 professors resigned from the staff. The appointment and promotion policy of the University is primarily geared to promotion from within the staff and hiring at the instructors rank.

Harold M. Gore, Head of the Department of Physical Education for Men retired September 30, 1953 after 40 years of devoted service. Gay T. Klein, Extension Professor of Poultry Husbandry retired after 19 years of service on August 31, 1953.

A new Executive Secretary of the Associate Alumni, Mr. Robert Leavitt was appointed July 1, 1953 and the position of Provost, coordinator of academic affairs replaced the title of Dean of the University on February 1, 1953.

Progress of the Building Program

The year has seen progress made in the building program. The \$111,000.00 Animal Disease Isolation Building was completed and placed in operation. The Dining Commons, a \$1,025,000 project, was completed and provides greatly needed additional facilities for feeding. Plans are being prepared for a \$1,281,000 Public Health Building and the \$850,000 Completion of the Engineering Building.

In addition to state funds, the Alumni-sponsored University of Massachusetts Building Association completed two new women's dormitories, started construction on an additional women's dormitory, and has authorization for building one more dormitory for men. This brings the total authorized construction to \$5,500,000. The two women's dormitories

completed make eleven dormitories, an apartment building and garage constructed on a self-liquidating basis by the non-profit Alumni Corporation.

Endowments and Gifts

The Endowment Funds of the University were increased by the Elizabeth L. McNamara Memorial of \$1,000.00, the gift of Mrs. Elizabeth L. McNamara, a Trustee of the University. The income from this fund is to be used annually to purchase a sterling silver goblet or trophy to be awarded to the cadet ranking number one in scholarship and military efficiency in the second year basic ROTC course.

At the close of the year, the principal of the Endowment Funds totaled \$297,997.

Special gifts for current purposes totaled \$94,775.27. Of this, \$5,898.11 was for scholarships and \$88,877.16 was for research. This was a decrease in scholarship gifts of \$19,599.08 caused mainly by the discontinuance of the German Agricultural Trainee Program and the Economic Cooperation Administration Program.

Grants for research increased \$20,248.99 over last year and increased \$33,165.16 in the past two years.

In addition to these gifts, the Trustees accepted the 1953 Senior Class Gift of \$1,995.05 for the furnishing of a University History Room in the Library in honor of Dean William L. Machmer who served the University from 1911-1953.

University Maintenance Costs

The total net cost to the Commonwealth of maintaining the University for the fiscal year was \$3,396,631.76. Of this amount, the direct costs of instruction accounted for only \$1,776,973.93, or 52 per cent of the total. The remaining costs are for other services which are part of the University including the administrative and plant costs.

Income from all sources received and transmitted to the Treasurer and Receiver General of the Commonwealth amount-

ed to \$1,830,753.25. This was an increase of \$118,405.35 over last year. Tuition payments for other than veterans increased by \$46,578.17.

A significant step in the administration of the University was taken when the Trustees created the position of Business Manager and relieved the Treasurer of many operating functions. The Business Manager took over the supervision of the operation of the plant, boarding halls, University Store, and many functions and services broadly classified under business management. This has improved the operating efficiency of the University and has made for better internal control of financial activities.

Trustees Policy

During the fall semester of 1953 the Board of Trustees developed a vigorous policy statement in presenting the budget of the University to the Governor and General Court of the Commonwealth. This statement recommended short range policy of holding the line on enrollments for at least two years until needed classroom facilities can be provided to bring the instructional program in place with housing and feeding facilities already existent. With vision and courage, recognizing the University of Massachusetts as the potential site for a revolutionary expansion and growth of public higher education, the Board further recommended a long range program of development moving toward a student body as large as 10,000 by 1965.

The conclusion of this Report of Progress, completing 90 years of service to the Commonwealth, is one of faith in the future of a state university second to none; of sanguine hope and strong optimism that the people of Massachusetts and their duly elected representatives will continue to develop higher education as the greatest bulwark of democracy and progress.

J. PAUL MATHER
Provost

THE UNIVERSITY OF MASSACHUSETTS

BULLETIN



1954 Summer Session Catalogue
Amherst, Massachusetts

SIX WEEK SUMMER SESSION
JULY 1 - AUGUST 12

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 Mildred Briggs, Associate Professor of Home Economics
 Fred V. Cahill, Jr., Professor of Government
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 Armand J. Costa, Instructor in Mechanical Engineering
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 Sidney Kaplan, Assistant Professor of English
 Robert P. Lane, Assistant Professor of English
 E. Ernest Lindsey, Professor of Chemical Engineering
 James B. Ludtke, Assistant Professor of Business Finance
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Charles F. Oliver, Assistant Professor of Education
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 Alfred X. Powers, Instructor in Agricultural Engineering
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 Walter S. Ritchie, Head, Department of Chemistry
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 Donald W. Rogers, Assistant Professor of Philosophy
 Israel H. Rose, Assistant Professor of Mathematics
 Sargent Russell, Assistant Professor of Agricultural Economics
 Arnold G. Sharp, Assistant Professor of Civil Engineering
 Stanley Vance, Associate Professor of Industrial Administration
 George P. Weidmann, Assistant Professor of Mechanical Engineering
 Arthur R. Williams, Assistant Professor of English
 Kenneth E. Wright, Associate Professor of Botany
 Raymond Wyman, Assistant Professor of Education
 Gail E. Cosgrove, Supervisor of Elementary Education, Natick
 Herbert J. Stack, Director of the Center for Safety Education, New York
 University

COMMITTEE ON SUMMER SESSION

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UNIVERSITY OF MASSACHUSETTS
SUMMER SESSION
1954

Regular Six-week Term — July 1-August 12

Short term for Driver Education — June 28-July 10

The University of Massachusetts will conduct a regular six-week summer session and a special two-week session in 1954. Opportunity for study in many basic courses and special fields will be offered. The program will give special attention to teachers, school administrators, veterans, and community leaders as well as undergraduate students.

In cooperation with the Center for Safety Education of New York University, a special two-week *Driver Education Instructor* course will be offered. This course is intended to prepare teachers seeking certification to teach Driver Education in secondary schools. Qualified persons may pursue this offering for graduate or undergraduate credit.

DEGREE CREDIT

All courses offered carry degree credit. They are organized on a one-semester basis, and are equivalent in method, content and credit to courses offered in the University during the regular academic year. Credits obtained in these courses are ordinarily accepted as transfer credits by other colleges and universities. Students attending the Summer Session usually earn up to six semester-hour credits toward graduate or undergraduate degrees. In cases where special permission is granted additional credits may be earned. Students desiring to pursue courses for advanced degrees must seek the approval of the Dean of the Graduate School.

EXPENSES

1. Tuition for residents of Massachusetts (entire session)	\$20.00
2. Tuition for residents of Massachusetts (Special Course)	\$10.00
3. Tuition for non-resident undergraduate students (entire session)	\$80.00
4. Tuition for non-resident undergraduate students (Special Course)	\$40.00
5. Tuition for non-resident graduate students per semester credit hour	\$10.00
6. Student Health and Activities Fee	\$2.00
7. Room rent for six weeks at \$4.00 per week	\$24.00
8. Board for six weeks (Monday through Friday) at \$9.50 per week	\$57.00

Payment for Summer Session fees is due June 21 and must be paid at or before registration. No students will be eligible to attend classes until fees are paid.

LIVING ACCOMMODATIONS AND HEALTH SERVICE

Students, not commuting from home, are expected to live in the University Dormitories and board at the University Dining Halls.

The University Infirmary will be kept open during the session with a staff doctor on call.

ADVANCE ENROLLMENT; VETERANS AND CIVILIANS

In order to facilitate arrangements, students contemplating attendance should notify the Director of the Summer Session at once, using the application form on page 11.

Veterans who plan to enroll under the G.I. Bill must present at the time of registration evidence of eligibility (V.A. certificate of eligibility or, if previously enrolled, a clearance through the University Coordinator). Veterans failing to obtain certification must make payment of tuition and fees.

New students who are not under G.I. Bills must file certificate of residence with the Treasurer's Office.

RECREATION

Under the direction of a faculty-student committee, programs for recreation offering many informal sports such as swimming, soft ball, baseball, tennis and hiking will be arranged.

A limited number of special lectures and entertainments will also be provided. Dances and one major picnic will be scheduled by the Social Committee.

CALENDAR

July 1, Thursday, 1:00-5:00 p.m. Registration, Drill Hall

July 2, Friday, 8:00 a.m. Classes Begin

August 11 Wednesday - August 12 Thursday, 12 M. Final Examinations

August 12, Thursday, 12 M. End of Summer Session

LIST OF COURSES

- BOTANY 1. INTRODUCTORY BOTANY.** The morphology and physiology of plants. Credit, 3.
1-1:50 MTWTF, Clark Hall, 104; 2-3:50 MTWT, Clark Hall, 202.
Mr. Wright
- CHEMISTRY 30. QUANTITATIVE ANALYSIS.** The theory and practice of representative determinations, both gravimetric and volumetric. Credit, 4.
8-9:10 MTWTF, Goessmann, 28; 9:20-11:50 MTWTF, Goessmann, 228.
Prerequisite, Chemistry 29. Mr. Roberts
- CHEMISTRY 33. ORGANIC CHEMISTRY.** A short course intended to satisfy the requirements in this field for all students who do not specialize in chemistry. Credit, 4.
9:20-10:30 MTWTF, Goessmann, 28; 1-4:50 TT, Goessmann, 112.
Prerequisites, Chemistry 1 and 2. Mr. Ritchie.
- ECONOMICS 25. ELEMENTS OF ECONOMICS.** Definitions and introductory principles of production, exchange, and the financial organization of society; the economics of distribution and the use of wealth and income. Credit, 3.
10:40-11:50 MTWTF, Goessmann, 26. Mr. Gamble.
- ECONOMICS 78. PUBLIC FINANCE.** Principles of public revenues and expenditures with special emphasis on the systems and problems of taxation. Credit, 3.
9:20-10:30 MTWTF, Goessmann, 26. Mr. Gamble.
- EDUCATION 153. EDUCATIONAL TESTS AND MEASUREMENTS.** Construction administration, scoring and interpretation of results of educational tests. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 32. Mr. Purvis.
- EDUCATION 160. ELEMENTARY SCHOOL CURRICULUM.** Content and methodology with emphasis on the unit method and activity program. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 12A. Miss O'Leary.
- EDUCATION 164. PRINCIPLES OF ELEMENTARY EDUCATION.** Aims, organization, program, and pupil population. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 12. Mr. Cosgrove.
- EDUCATION 166. PREPARATION AND USE OF AUDIO-VISUAL AIDS.** A wide variety of aids studied from the point of view of how they may be used effectively in teaching. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 32. Mr. Wyman
- EDUCATION 183. PRINCIPLES OF SECONDARY EDUCATION.** Aims, pupil population, program, guidance, problems and trends of junior and senior high school. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 32. Mr. Oliver.
- EDUCATION 208. THE TEACHER AND SCHOOL ADMINISTRATION.** Problems in admission, promotion, discipline, personnel, supervision, tenure, salary, schedules, etc. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 30. Mr. Purvis.

- EDUCATION 210. ADMINISTERING EXTRA-CURRICULAR ACTIVITIES. Scheduling, financing, sponsorship, regulation of pupil participation, liability. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 30. Mr. Oliver.
- EDUCATION 259. TEACHING ELEMENTARY SCHOOL SCIENCE. Methods and materials and their place in the activity program. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 12 Mr. Cosgrove.
- EDUCATION 265. TECHNIQUES IN REMEDIAL READING. Methods and materials in diagnosis and remedial instruction. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 12A. Miss O'Leary.
- EDUCATION 267. AUDIO-VISUAL LABORATORY. Practical experience in setting up and using common audio-visual equipment and materials. Credit, 3.
10:40-11:50 MTWTF, South College. Mr. Wyman.
- ENGLISH 2 & SPEECH 3. ENGLISH COMPOSITION. Intended to teach straight thinking, sound structure, clear and correct expression. Credit, 3.
10:40-11:50 MTWTF, Old Chapel, A. Mr. Kaplan.
- ENGLISH 25. HUMANE LETTERS. A general reading course based upon a chronological selection of masterpieces: classical, continental and English. Credit, 3.
9:20-10:30 MTWTF, Old Chapel, A. Mr. Lane.
- ENGLISH 26. HUMANE LETTERS. A continuation of English 25, but may be elected independently. Credit, 3.
8-9:10 MTWTF, Old Chapel, A. Mr. Kaplan.
- ENGLISH 67, 167. AMERICAN PROSE. A course in the chief American prose writers of the nineteenth and twentieth centuries. Credit, 3.
9:20-10:30 MTWTF, Old Chapel, B. Mr. O'Donnell.
- ENGLISH 68, 168. MODERN DRAMA. The development of English and American drama from the time of Ibsen to the present day. Credit, 3.
10:40-11:50 MTWTF, Old Chapel, B. Mr. Williams.
- ENGLISH 73, 173. THE NOVEL FROM DEFOE THROUGH THE VICTORIANS.* The development of the novel, the reading and discussion of eight or nine great English novels of the eighteenth and nineteenth centuries. Credit, 3.
8-9:10 MTWTF, Old Chapel, D. Mr. Helming.
- FINANCE 55. FINANCIAL INSTITUTIONS. A general course which surveys the development and operations of our financial institutions and provides an integrated study of the entire American financial structure. Credit, 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 1. Mr. Ludtke.
- FRENCH WORKSHOP Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 8. Mr. Johnson.
- GEOLOGY 27. PHYSICAL GEOLOGY. An introduction to the agents and processes that modify the earth's crust. Credit, 3.
8-10:30 MTWTF, Fernald Hall, K & B. Mr. Johansson.

GERMAN WORKSHOP. For graduate students. An intensive course designed to provide the student with the elements of German needed for acquiring a reading knowledge of the language. Study of the basic principles of grammar and sentence structure. Reading and translation of scientific and literary texts. Credit, 3.

8-9:10 MTWTF, Liberal Arts Annex, 1.

Mr. Goldsmith.

GOVERNMENT 25. AMERICAN GOVERNMENT. A study of the principles, machinery, dynamics and problems of American national government.

8-9:10 MTWTF, Goessmann, 26.

Credit, 3.

MR. CAHILL.

GOVERNMENT 55. THE PRESIDENCY IN AMERICAN GOVERNMENT. The growth of the Executive in the United States Government; varying conceptions of the Presidential office. Constitutional and political aspects of the office in legislation, administration, the conduct of foreign affairs. The President as party leader. Credit, 3.

10:40-11:50 MTWTF, Goessmann, 28.

Mr. Cahill.

HISTORY 6. MODERN EUROPEAN CIVILIZATION. A basic survey course covering the period from 1815 to the present. Credit, 3.

9:20-10:30 MTWTF, Old Chapel, C.

Mr. Potash.

HISTORY 70. EUROPE SINCE 1918. Approximately half of the course is devoted to international affairs, the other half to a study of recent internal developments in the principal European countries. Credit, 3.

8-9:10 MTWTF, Old Chapel, C.

Mr. Caldwell.

HISTORY 71. HISTORY OF NEW ENGLAND TO 1860. The growth of institutions and ideas from the colonial foundations to the middle nineteenth century. While the emphasis will be placed upon the political, social and cultural aspects of New England life, attention will also be given to the impact of national development upon the life of the region. Credit, 3.

10:40-11:50 MTWTF, Old Chapel, C.

Mr. Cary.

HOME ECONOMICS 63. ARTS AND CRAFTS. Introduction to design and execution in crafts particularly adapted to work with children in schools, playgrounds, summer camps; and for any age in recreational leadership and occupational therapy. Credit, 3.

8-10:30 MTWTF, Skinner Hall, 119.

Miss Briggs.

HOME ECONOMICS 77. HOME MANAGEMENT PRACTICE. In the home management house, students assume the responsibilities involved in managing a home. Hours by arrangement. The Homestead. Credit, 3.

Miss Forbes.

INDUSTRIAL ADMINISTRATION 64. PERSONNEL MANAGEMENT. A study of the principles of the management of labor relations. Credit, 3.

9:20-10:30 MTWTF, Liberal Arts Annex, 1.

Mr. Vance.

MATHEMATICS 6. INTRODUCTORY CALCULUS FOR ENGINEERS. May be used as a substitute for Mathematics 29, Differential Calculus. Differentiation, with applications; technique of integration. Credit, 4.

9:20-11 MTWTF, Mathematics Building, B.

Mr. Rose.

Prerequisites, Algebra, trigonometry, and plane analytic geometry.

- MATHEMATICS 7. ALGEBRA AND TRIGONOMETRY.** Fractions, quadratic equations, exponents, logarithms, variation, determinants of the second and third orders, and plane trigonometry. Credit, 3.
8-9:10 MTWTF, Mathematics Building, B. Mr. Rose.
- MUSIC 51. DISCOVERING MUSIC.** An elementary, non-technical course dealing with the elements of music, forms in music, musical compositions, and with selected composers. Credit, 3.
9:20-10:30 MTWTF, Memorial Hall. Mr. Alviani.
- MUSIC 62. TEACHING MUSIC IN THE ELEMENTARY GRADES.** The principles of musical development are studied with particular emphasis on presentation in the classroom. Credit, 3.
10:40-11:50 MTWTF, Memorial Hall. Mr. Contino.
- PHILOSOPHY 61. INTRODUCTION TO PHILOSOPHY.** A general approach to philosophy both from the standpoint of method and content; an attempt to understand and evaluate contemporary ideas. Credit, 3.
8-9:10 MTWTF, Liberal Arts Annex, 3. Mr. Rogers.
- PHILOSOPHY 64, 164. ETHICS.** The meaning of good and evil, right and wrong; a survey of ethical theories and practices and an attempt to evaluate these theories with reference to modern ethical problems. Credit 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 3. Mr. Rogers.
- PSYCHOLOGY 26. GENERAL PSYCHOLOGY.** An introductory course dealing with the basic principles and applications of psychology with regard to the understanding and control of behavior. Credit 3.
8-9:10 MTWTF, Liberal Arts Annex, 27. Mr. Mausner.
- PSYCHOLOGY 82, 182. PSYCHOLOGICAL TESTS.** Different varieties of psychological tests are studied. Practice will be given in administering, scoring, interpreting, and evaluating tests. Credit, 3.
9:20-10:30 MTWTF, Liberal Arts Annex, 27. Mr. Epstein.
- PSYCHOLOGY 94, 194. CHILD PSYCHOLOGY.** The course aims to develop an understanding of the behavior of the child. Psychological aspects of the following are considered: original nature, maturation, play, social behavior, personality and mental hygiene. Credit 3.
10:40-11:50 MTWTF, Liberal Arts Annex, 27. Mr. Biehler.
- SOCIOLOGY 28. INTRODUCTION TO SOCIOLOGY.** An outline study of the social order, and of the individual considered as a member of his various groups. Credit, 3.
9:20-10:30 MTWTF, Old Chapel, D. Mr. Driver.
- SOCIOLOGY 51, 151. URBAN SOCIOLOGY.** A comparative study of modern social conditions, and methods of adjustment, with special reference to city environment. Credit, 3.
10:40-11:50 MTWTF, Old Chapel, D. Mr. Manfredi.
- SOCIOLOGY 75, 175. SOCIAL PROBLEMS.** A study of abuses affecting the home, recreation, industry, family, welfare, public health, government, mental disease and crime. Credit, 3.
8-9:10 MTWTF, Old Chapel, D. Mr. Driver.

- SPEECH 91. EXTEMPORE SPEECH.** The theory and practice of public speaking for business and professional purposes. Credit, 3.
 9:20-10:30 MTWTF, Old Chapel Auditorium. Mr. Niedeck.
- STATISTICS 79, 179. ELEMENTARY STATISTICS.** Methods of collecting, analyzing, interpreting and presenting statistical data. Credit, 3.
 1-3:15 MTWTF, Stockbridge Hall, 220. Mr. Russell.

SPECIAL COURSES

- CHEMICAL ENGINEERING 75. INSTRUMENTATION.** A detailed study of the underlying principles and practices of indicating, recording and controlling instruments used on industrial process equipment. Credit, 3.
 8-10 TT, 1-4 Th. (August 9-September 17) Mr. Lindsey.
 Engineering Annex.
 Prerequisites, Physics 27, 28; Chemical Engineering 55, Calculations.
- CHEMICAL ENGINEERING 88. UNIT OPERATIONS.** A quantitative study of pilot plant size equipment illustrating some unit operations. Credit 3.
 3 8-hour days per week, MWF. (August 9-September 17) Mr. Lindsey.
 Engineering Annex.
- CIVIL ENGINEERING 27. PLANE SURVEYING.** The basic principles of mensuration; use of tape, transit, and level; a brief consideration of route surveying. Credit, 3.
 3 44-hour weeks: (August 9-27; August 30-September 17).
 Mr. Grow, Mr. Weidmann, Mr. O'Hara.
 Engineering Building.
 Prerequisite, Mathematics 5, Introductory Engineering Mathematics, or Mathematics 7, Algebra and Trigonometry.
- CIVIL ENGINEERING 28. PROPERTY AND TOPOGRAPHIC SURVEYING.** A transit and tape property survey requiring reference to Registry of Deeds records. Credit, 3.
 3 44-hour weeks: (June 7-25; June 28-July 16) Mr. Hendrickson and Mr. O'Hara.
 Engineering Building.
 Prerequisite, Civil Engineering 25, Surveying or Civil Engineering 27, Plane Surveying.
- CIVIL ENGINEERING 30. ROUTE SURVEYING PRACTICE.** A preliminary survey for a short highway location and the preparation of maps and profile. Credit, 3.
 3 44-hour weeks: (June 7-25; June 28-July 16) Mr. Osgood.
 Engineering Building.
 Prerequisite, Civil Engineering 25, or 27, Surveying.
- MECHANICAL ENGINEERING 23. SHOP.** Woodworking, pattern making, and welding; use of various machine and hand tools used in metal working. Credit, 3.
 3 44-hour weeks: (August 9-27; August 30-September 17) Mr. Costa and Mr. Powers.
 Engineering Shop.
- MECHANICAL ENGINEERING 27. SHOP.** Woodworking and pattern making; welding. For mechanical engineering majors. Credit, 3.
 3 44-hour weeks: (June 7-25; June 28-July 16) Mr. Patterson and Mr. Powers.
 Engineering Shop.

MECHANICAL ENGINEERING 28. MACHINE SHOP. The fundamental machine tools; lathe, planer, shaper, milling machine and drill press. Credit, 3.

3 44-hour weeks: (June 7-25; June 28-July 16) Mr. Costa and Mr. Sharp.
Engineering Shop.

FORESTRY 55, 155. THE ELEMENTS OF FOREST MENSURATION. Methods of determining the volume and value of the forest growing stock; type mapping; methods of predicting growth of trees and stands. Credit, 3.

3 44-hour weeks: (June 7-25) Mr. Ganley and Mr. MacConnell.
Conservation Building.

FORESTRY 78, 178. HARVESTING OF FOREST PRODUCTS. Practice in the harvesting and preparation of direct forest products. Field trips to active forest properties and to visit pulpwood operations and manufacturing plants.

Credit, 3.

3 44-hour weeks: (June 28-July 16) Mr. Ganley and Mr. MacConnell.
Conservation Building.

PHYSICAL EDUCATION 86, 186. DRIVER EDUCATION AND DRIVER TRAINING. Objectives, scope, content, and problems of driver training; teaching materials; psycho-physical tests; motor vehicle construction, operation, and maintenance; advanced driving practices; administrative standards; practice teaching and behind-the-wheel instruction. Offered by the Department of Physical Education for Men in cooperation with the Center for Safety Education, New York University, and the Massachusetts Registry of Motor Vehicles.

Credit, 2.

8-12 MTWTF, June 28-July 10.

Mr. Stack and Staff.

Bulletin

UNIVERSITY OF
MASSACHUSETTS



COMMENCEMENT

1954

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PROGRAM

FRIDAY, JUNE 4, 1954

8:00 p.m. Informal Alumni Class Reunions.
9:00 p.m. Senior Hop.

SATURDAY, JUNE 5, ALUMNI-CLASS DAY

10:00 a.m. Annual Meeting, Associate Alumni, Memorial Hall.
10:30 a.m. Semi-Annual Meeting, Board of Trustees, Butterfield House.
12:00 m. Alumni Chicken Barbecue, near College Pond.
2:00 p.m. Alumni Parade to Ball Game.
2:30 p.m. Varsity Baseball Game with Amherst College, Alumni Field. Following Game—Half Hour Concert on Chime.
6:00 p.m. Fraternity and Class Reunions as arranged by organizations.
9:00 p.m. Roister Doister Play, "Ah, Wilderness!", Drill Hall.

SUNDAY, JUNE 6, COMMENCEMENT

8:45 a.m. Commissioning of Seniors as Second Lieutenants in Army and Air Force Reserve.
9:00 a.m. Varsity M Club Breakfast Meeting, University Commons.
11:00 a.m. Baccalaureate Service, the Cage.
Speaker to be announced.
12:00 m. Fraternity and Class Reunions as arranged by organizations.
3:00 p.m. Academic Procession from Memorial Hall.
3:30 p.m. Graduation Exercises.
Speaker: Leonard Carmichael, Ph.D., Sc.D., Litt.D., LL.D., Secretary, Smithsonian Institution

CLASS REUNIONS

ALUMNI REGISTRATION HEADQUARTERS

MEMORIAL HALL

- 1889 65th Reunion—Franklin W. Davis, 42 Kenneth Street, West Roxbury, Mass.
- 1894 Annual Reunion—S. Francis Howard, 58 Main Street, P. O. Box 94, Northfield, Vt.
- 1899 55th Reunion—George Hubbard, Amherst Road, Sunderland, Mass.
- 1902 Annual Reunion—John C. Hall, King Philip Road, South Sudbury, Mass.
- 1904 50th Reunion—Sumner Parker, 1 Sunset Court, Amherst, Mass.
- 1909 45th Reunion—Arthur Hubbard, Sunderland, Mass.
- 1911 Annual Reunion—Leonard M. Johnson, P. O. Box 583, Danbury, Conn.
- 1914 40th Reunion—Edward Hazen, 768 No. Pleasant Street, Amherst, Mass.
- 1916 Annual Reunion—Conrad H. Lieber, Spring Lane, East Pembroke, Mass.
- 1919 35th Reunion—Mary Garvey, Marshall Hall Annex, University of Mass.
- 1924 30th Reunion—Allen Leland, 17 Stilson Avenue, Florence, Mass.
- 1929 25th Reunion—M. L. Blaisdell, East Experiment Station, University of Mass.
- 1934 20th Reunion—Dr. Karol Kucinski, Stockbridge Hall, University of Mass.
- 1939 15th Reunion—Howard Steff, Hamilton Court, Hazardville, Conn.
- 1944 10th Reunion—Ruth Symonds Zak, 52 Chestnut Street, Amherst, Mass.

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CLASS REUNIONS

(Continued)

- 1949 5th Reunion—Doris Abramson, Stockbridge Hall, University of Mass.
1951 3rd Reunion—Fred Davis, Jr., General Electric Company, Holyoke, Mass.
1953 1st Reunion—David Flood, 32 South Allen Street, Albany 8, N. Y.



ALUMNI REUNION PROGRAM

SATURDAY, JUNE 5

- 10:00 a.m. Annual Meeting of the Associate Alumni, Auditorium, Memorial Hall.
12:00 Noon Alumni Chicken Barbecue—near College Pond.
2:30 p.m. Varsity Baseball Game—with Amherst College—Alumni Field. Following the game, there will be a half-hour concert on the college chime.
6:00 p.m. Class and fraternity reunions and suppers as arranged by the various organizations.
9:00 p.m. Roister Doister Play—"Ah, Wilderness!", Drill Hall.

VOL. XLVI

MAY, 1954

NUMBER 5

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